SONY

DIGITAL VIDEOCASSETTE RECORDER

DVW-250/250P

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1-1 Features

The DVW-250/250P is a portable videocassette recorder in the Digital Betacam series. It allows recording and playback of sound and picture in the Digital Betacam format.

1-1-1 Features of the DVW-250/250P

The following are some of the features of the DVW-250/250P.

Flexible input/output interfaces

The unit is designed to accept either analog video (component/composite) and audio signals, or Dl format serial digital video/audio signals. It is therefore highly suitable for use not only in analog systems but also in all-digital systems.
Analog input signals pass through the built-in A/D converter, and are converted to 10-bit digital video signals and 20-bit digital audio signals. Similarly, both digital and analog output signals are provided, for flexible support of mixed analog-digital systems.

Simple system configuration using the serial digital interface

The serial digital inputs to the SDI (Serial Digital Interface) connector provide for one video signal and four audio channels through a single BNC connector. When connected to other digital equipment, this makes setting up and transporting, for example on outside assignments, extremely straightforward.

High quality digital recording

This unit records both sound and vision on the tape in the Digital Betacam format (see the figure at the end of this page). Since all internal processing is digital, signal outputs are stable, and reproduction is very accurate.

Designed for field operations

The unit is compact and lightweight (main unit approximately 6.6 kg or 14 Ib 8 oz), making it ideal for carrying and operating in the field. The power consumption while recording is about 26 W (with the MODE switch in the SAVE position and the CONFI switch in the OFF position), and the optional battery pack provides about two hours of continuous recording.

High speed search with color picture

The search speed can be set to 2 times, 5 times or 8 times normal speed. Using rewind or fast forward, a color playback signal is available at 24 times normal speed, making tape cuing both fast and accurate.

Two LCD units for ease of operation

The front panel includes two LCDs: the smaller shows the unit status and time indications, and the larger displays the audio level meters, the video level meters, or the setup menu.
By switching the display mode, it is possible to change the audio level indications for fine adjustment in a narrower range.
Backlighting is provided to make the displays easier to read in gloomy conditions.

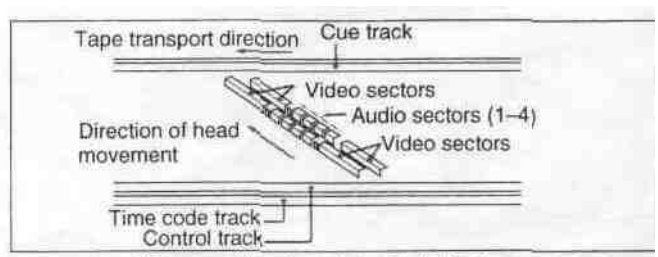
1-1-2 Digital Betacam Format

Overview

The Digital Betacam format is based on the conventional Betacam and Betacam SP formats, and allows high-performance digital recording and playback.
One of the features of the Digital Betacam format is the introduction of a new technique known as "coefficient recording," which allows the data rate of the video signal to be reduced to approximately half. This makes 120 minutes or more of recording possible with an "L" size cassette.
The compressed video signal includes error-correcting codes (ECC), which correct the signal on playback. This powerful error-correcting system provides the improved signal reliability which is another feature of the Digital Betacam format.

Recording format

The processing of the Digital Betacam video signal conforms to the Dl 4:2:2 component digital format, with digitization according to ITU-R BT. 601.
The following figure shows schematically the Digital Betacam recording format on the tape. A set of six diagonal tracks contains one field of video and four channels of audio information.

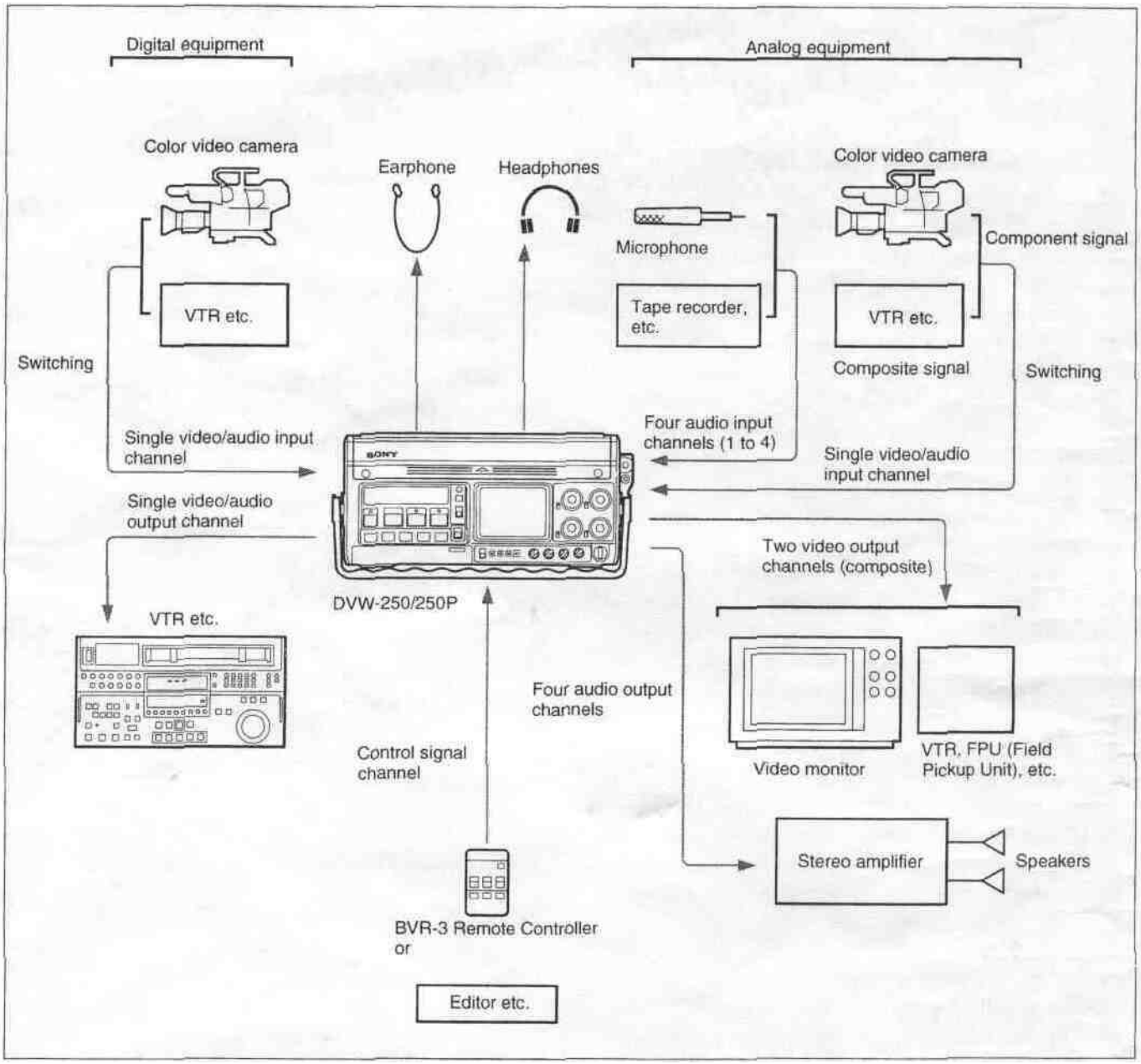


Tape recording format for Digital Betacam

1-2 System Configuration

The following figure shows the configuration of a typical system centered on the DVW-250/250P.

For details, such as the connector names, see Section 4-1-1 "Connecting Digital Equipment" (page 4-1) and Section 4-1-2 "Connecting Analog Equipment" (page 4-2).



Typical DVW-250/250P system configuration

1-3 Getting the Best Performance from the Unit

Notes on operation and storage

Protect the unit from violent shocks
It is possible to damage the internal circuitry and mechanism or spoil the external finish.

After use
Turn the power switch off.

When not using the unit for a long period
Remove the cassette and batteries.

Operating and storage locations
Store the unit in a level place which is well ventilated.
Avoid operation or storage in the following locations:
- In extremely hot or extremely cold conditions
- In extremely dusty conditions
- In very high humidity
- Where the unit will be subjected to severe vibration
- Close to strong magnetic fields
- Exposed to direct sunlight for long periods, or close to heating equipment

Condensation

If you move the unit suddenly from a cold place to a warm place, or use it in a very humid location, condensation may form on the head drum. If the unit is operated in this state, the tape may adhere to the drum, and cause a failure or even permanent damage. Take the following steps to prevent this from happening:
- Remove the cassette before operating the unit in conditions where condensation is likely to form.
- If the HUMID indication is showing, condensation is present: wait until the HUMID indication disappears, and then insert a cassette.
- Do not load a cassette on which condensation has formed into the unit.

Cleaning the video heads

Use the Sony BCT-5CLN or BCT-D12CL Cleaning Cassette for cleaning the audio and video heads. Follow the instructions with the cleaning cassette.

Related manuals

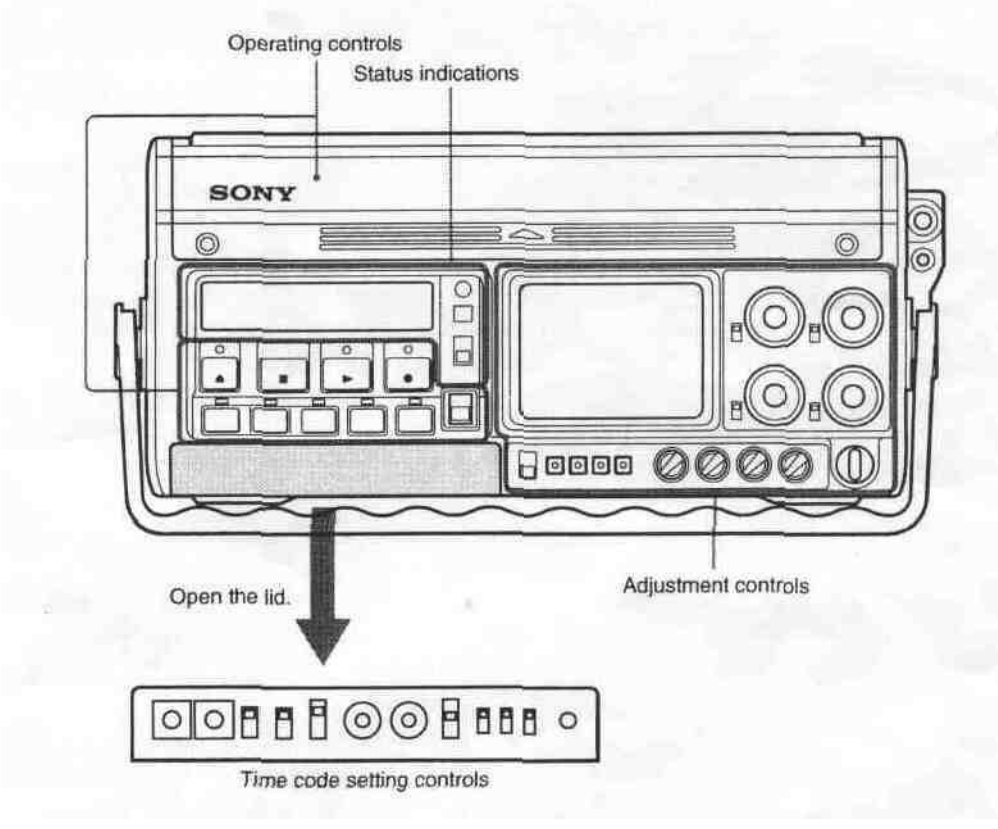
In addition to this Operation Manual, the following manuals are available.
These should be consulted as necessary.
- Maintenance Manual Part 1 (supplied)
  Describes the maintenance of this unit.
- Maintenance Manual Part 2 (option)
  Contains circuit diagrams and adjustment procedures required for the maintenance of this unit.

2-1 Front Panel

The front panel is divided into four sections as follows:

- Operating controls
- Status indications
- Adjustment controls
- Time code setting controls

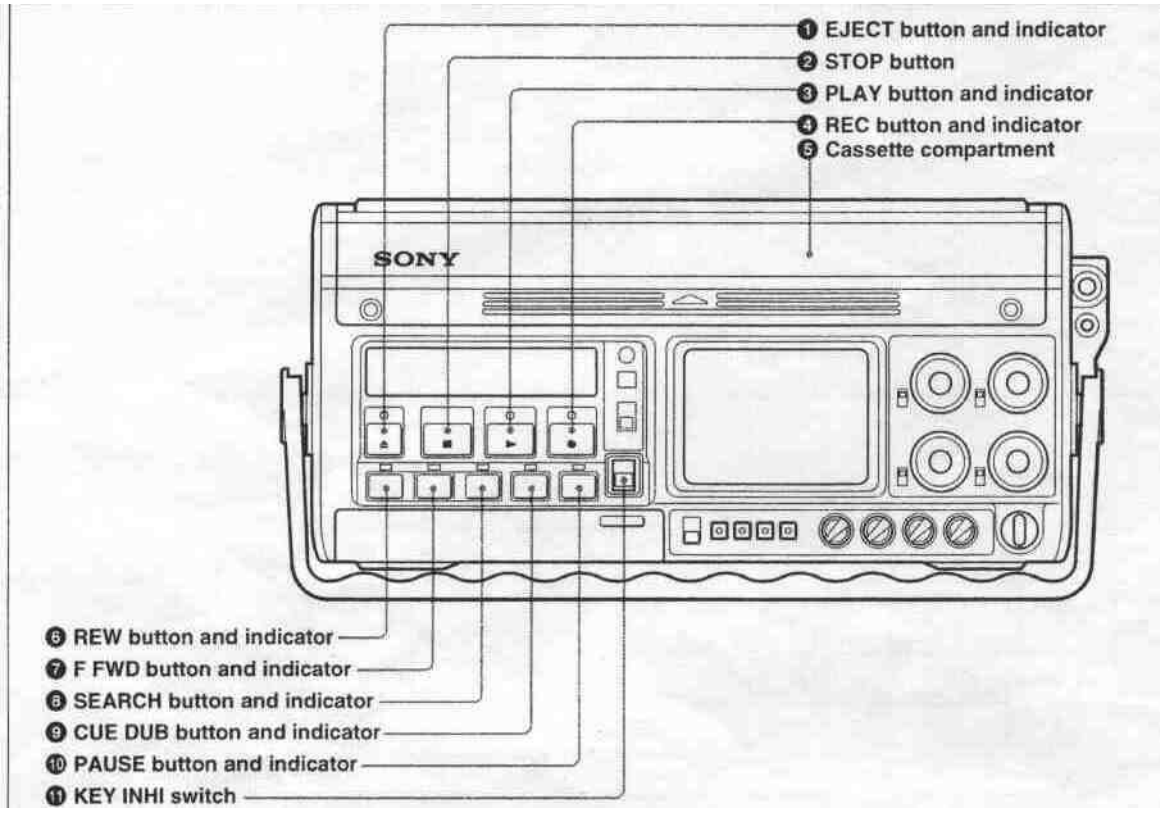
Of these, the controls for time code settings are normally covered by a hinged lid.



Front panel

2-1 Front Panel

2-1-1 Operating Controls


❶ EJECT button and indicator
❷ STOP button
❸ PLAY button and indicator
❹ REC button and indicator
❺ Cassette compartment
SONY
❻ REW button and indicator
❼ F FWD button and indicator
❽ SEARCH button and indicator
❾ CUE DUB button and indicator
❿ PAUSE button and indicator
⓫ KEY INHI switch

Operating controls

❶ EJECT ⏏ button and indicator

Press this button to eject the cassette. The indicator lights while the cassette is being ejected.

❷ STOP■ button

Press this button to stop the tape transport.

❸ PLAY ► button and indicator

Press this button to play back the tape. To start recording, press this button and the REC button simultaneously. For audio dubbing, press this button and the CUE DUB button simultaneously.
The indicator lights during playback, recording, or audio dubbing.

❹ REC● (record) button and indicator

To start recording, press this button and the PLAY button simultaneously. The indicator flashes during recording.
By pressing this button alone while the tape transport is stopped, or during fast forward, rewind or playback, it is possible to monitor an E-E signal".
Pressing this button alone while no cassette is loaded switches the unit to E-E mode[21].

Consecutive recording

When making consecutive recordings, using the PAUSE button to stop recording ensures that successive takes are joined without picture breakup. If you press the STOP button to stop recording, then restart by holding down the REC button then pressing the PLAY button, the later recording will overlap the previous one by a few frames, but there will again **be** no picture breakup. On the other hand, it you hold

1) **E-E signal**
Abbreviation of "Electric-to-Electric signal," meaning that the signal passes through internal electric circuits, but not through magnetic conversion circuits such as heads and tapes.

2) **E-E mode**
Abbrevialion of "EIectric-to-Electric mode," meaning the stale of the unit in which it is possible to monitor an E-E signal. This mode is used for confirming input signals heiorc recording.

down the PLAY button then press the REC button, recording starts immediately, but there may be picture breakup.
However, once a cassette has been removed and reinserted, even pressing the REC button then the PLAY button may sometimes not result in a proper join.

❺ Cassette compartment
Raise the lid in the direction indicated (△) and insert the cassette.

❻ REW◀◀ (rewind) button and indicator
Press this button to rewind the tape. Pressing this button after pressing the SEARCH button starts a search of the tape in the reverse direction at a maximum 8 times normal speed (selectable from 2 times, 5 times and 8 times). The indicator lights during the rewind operation, and goes off when it is completed.

❼ FFWD▶▶ (fast forward) button and indicator
Press this button to fast forward the tape. Pressing this button after pressing the SEARCH button starts a search of the tape in the forward direction at a maximum 8 times normal speed (selectable from 2 times, 5 times and 8 times). The indicator lights during the fast forward operation, and goes off when it is completed.

❽ SEARCH button and indicator
Press this button to play back at high speed. After pressing this button, press the F FWD button to play back in the forward direction or the REW button to play back in the reverse direction. The speed can be 2 times, 5 times or 8 times normal speed, and this is selectable by a setup operation.
The indicator lights during the search operation. Pressing the button again turns the indicator off, and ends the search function.

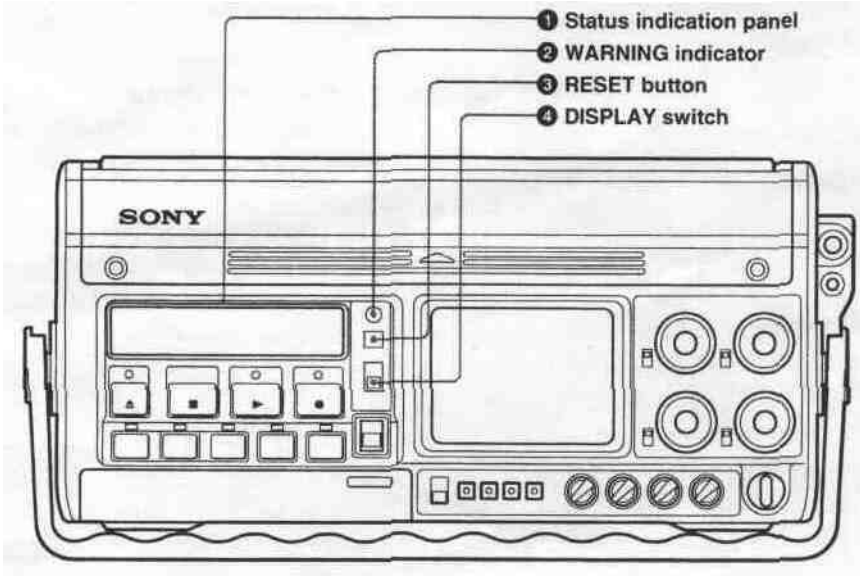
❾ CUE DUB button and indicator
Hold this button down, then press the PLAY button to record analog sound on the cue track of the tape *(see page 1 - 1)*. This records the channel 4 audio.
Pressing this button alone allows the channel 4 audio to be monitored in E-E mode.
The indicator flashes during recording, and lights continuously during monitoring.

❿ PAUSE❚❚ button and indicator
Press this button to pause the tape movement during recording or playback. While paused, the indicator flashes. Pressing the button again turns the indicator off, and ends the paused state.

⓫ KEY INHI (inhibit) switch
When this switch is in the ON position, all operation buttons are disabled, thus preventing a possible inadvertent operation.
To release this lock, return the switch to the OFF position.

Note
When the KEY INHI switch is in the OFF position, only the STOP button and PAUSE button operate during recording, but at all other times, all buttons operate.

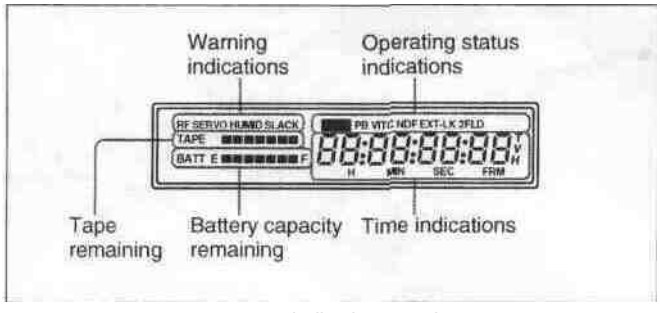
2-1-2 Status Indications



Status indications

1 Status indication panel

This displays warnings, the tape remaining, the battery capacity remaining, the operating status, and time indications.



Status indication panel

The details of these indications are as follows:

Warning indications

The following indications appear in the event of a fault in the unit:

RF: Recording or playback is not possible because the video heads are clogged, or there is a fault in the circuit.

SERVO: The drum servo or capstan servo lock is lost.

HUMID: There is condensation on the head drum. Alternatively, the humidity is high.

SLACK: The tape winding is not correct.

For more details, see the section "Warning Indications" (page A-1).

Operating status indications

These show the operating status of the unit, as follows:

DIAG: in diagnosis mode

PB: when the playback time code is displayed.

VITC: when the time code displayed is the VITC (Vertical Interval Time Code)

NDF: in non-drop frame mode (DVW-250 only) *(see the footnotes on page 4-9)*

EXT-LK: when the time code on this unit is locked to the time code on an external unit

2FLD: when the internal time code generator is not color frame locked"

1) Color frame lock

This forces the time code frame number to be even for the first and second color fields and odd for the third and fourth color fields. When there is color frame information in the input video signal and the time code is not locked to an external time code, then in the F-RUN mode the color frame lock is automatically applied.

Time indications

This display shows the value selected by the DISPLAY switch from CTL (control track running time), time code, or user bits. However, if the REAL TIME record/set switch *(see page 2-9)* in the time code setting controls is in the SET position, the real time appears here, regardless of the DISPLAY switch setting.

Tape remaining indication

This shows the length of the remaining tape. Each segment corresponds to 5 minutes of remaining tape, but if 30 minutes of tape or more remains, all seven segments show.

For details of the segment indications and remaining tape times, see Section 3-2-4 "Checking the Remaining Tape (page 3-7).

When the remaining tape time is approximately two minutes, the leftmost segment and the "TAPE" indication flash, and simultaneously the WARNING indicator flashes, accompanied by an intermittent warning tone. At the end of the tape, the WARNING indicator stays on, and the warning tone becomes continuous.

Battery capacity remaining indication

This shows the remaining battery capacity. When the battery pack is fully charged, all seven segments show. As the battery capacity decreases, the segments disappear in turn from the right.

For details of the segment indications and remaining battery capacity, see Section 3-1-4 "Checking the Remaining Battery Capacity (page 3-4).

When the battery pack is almost exhausted, the leftmost segment and the "BATT" and "E" indications flash, and simultaneously the WARNING indicator flashes, accompanied by an intermittent warning tone. When the battery pack is completely exhausted, the WARNING indicator stays on, and the warning tone becomes continuous.

❷ WARNING indicator

This lights or flashes when the battery pack is nearly exhausted, there is less than two minutes of tape left, or there is a fault in the unit.

For more details, see the section "Warning Indications" (page A-l).

❸ RESET button

This resets the time display.
When the CTL value (control track running time) is displayed, it is reset to "0:00:00:00". When one of the time code, or user bit value or real time is displayed, it is reset to "00:00:00:00".

❹ DISPLAY switch

This selects the time value displayed.

CTL: Displays the tape running time in hours, minutes, seconds and frames.

TC: Displays a time code.

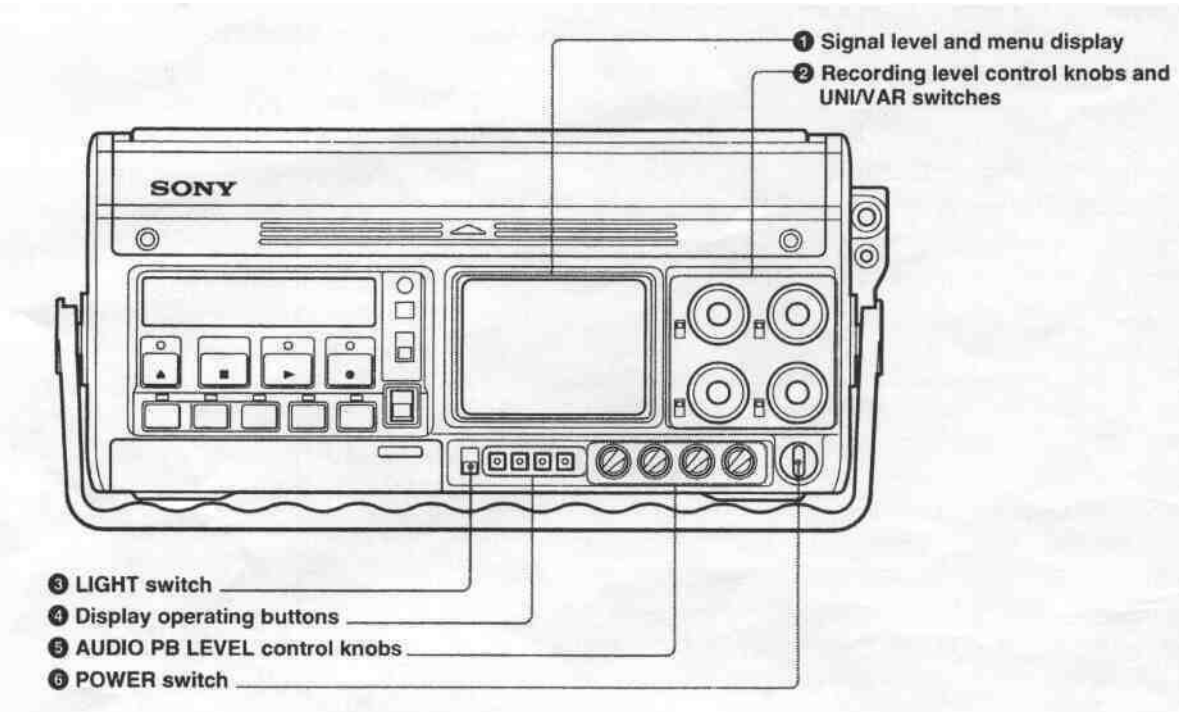
U-BIT: Displays the user bits.
Note that when the user bits are displayed, no colons appear.

However, the value displayed is not totally determined by the setting of the DISPLAY switch. The REAL TIME record/set switch *(see page 2-9)* takes precedence, followed by the F-RUN/R-RUN switch *(see page 2-9)*, and finally the DISPLAY switch setting.

Switch settings and time value displayed

REAL TIME record/set switch position	F-RUN/ R-RUN switch position	DISPLAY switch position	Value displayed
SET	Ignored	Ignored	Real time
REC ON or OFF	SET	TC or CTL	Time code
		U-BIT	User bits
	F-RUN or R-RUN	CTL	CTL
		TC	Time code
		U-BIT	User bits

2-1-3 Adjustment Controls


❶ Signal level and menu display
❷ Recording level control knobs and UNI/VAR switches
SONY
❸ LIGHT switch
❹ Display operating buttons
❺ AUDIO PB LEVEL control knobs
❻ POWER switch

Adjustment controls

❶ Signal level and menu display

Pressing the DISPLAY button in the display operating buttons cycles this display through the audio level meters, video level meters, and setup menus.

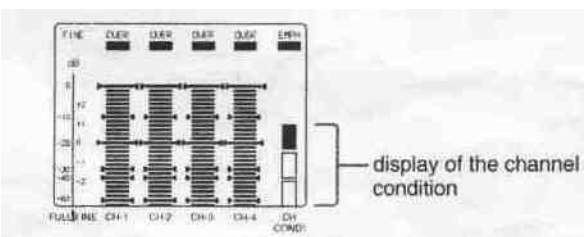
When the unit is powered on, and whenever five minutes elapse without an operation, the display reverts to the audio level meters.

When the display is showing the audio level meters, the indication "CH CONDI" (channel condition) appears. One of the three segments above it appears, to indicate the status of the playback signal.

Top segment: The playback signal is normal.

Middle segment: The playback signal is somewhat degraded, but adequate.

Bottom segment: The playback signal is degraded. If this segment appears continuously, head cleaning or an internal servicing is required.



❷ Recording level control knobs and UNI/VAR (unity/variable) switches

When the audio inputs are analog, these knobs can be used to adjust the recording level on each of the four channels, while watching the audio level meters.

Below and to the left of each knob is a UNI/VAR (unity/variable) switch, and the position of this switch affects the recording level as follows:

UNI: The input signal is recorded without changing its level, regardless of the position of the control knob.

VAR: The position of the control knob determines the recording level.

❸ LIGHT switch

This switches on and off the illumination of the status indication panel *(see page 2-4)* and signal level and menu display, and also controls the brightness of the indicators for the operating buttons.

ON: Turns the display illumination on.

OFF: Turns the display illumination off.

BRT: Turns the display illumination off, and increases the brightness of the indicators. This makes the indicators easier to see outdoors, for example.

❹ Display operating buttons

There are four buttons, and their functions depend on the current state of the signal level and menu display, as shown in the following table.

Functions of display operating buttons

Display state / Operating button	Audio level meters	Video level meters	Setup menu
DISPLAY	Switch to video level meters	Switch to setup menu	Switch to audio level meters
UP	(No function)	(No function)	Move cursor (*)up
FREEZE/DOWN	Freeze playback frame or end freeze	(No function)	Move cursor (*) down
FINE/SET	Toggle display mode (FULL/ PINE)	(No function)	Select item indicated by cursor (*)

❺ AUDIO PB (playback) LEVEL control knobs

These adjust the playback levels for each separate channel of analog audio output.

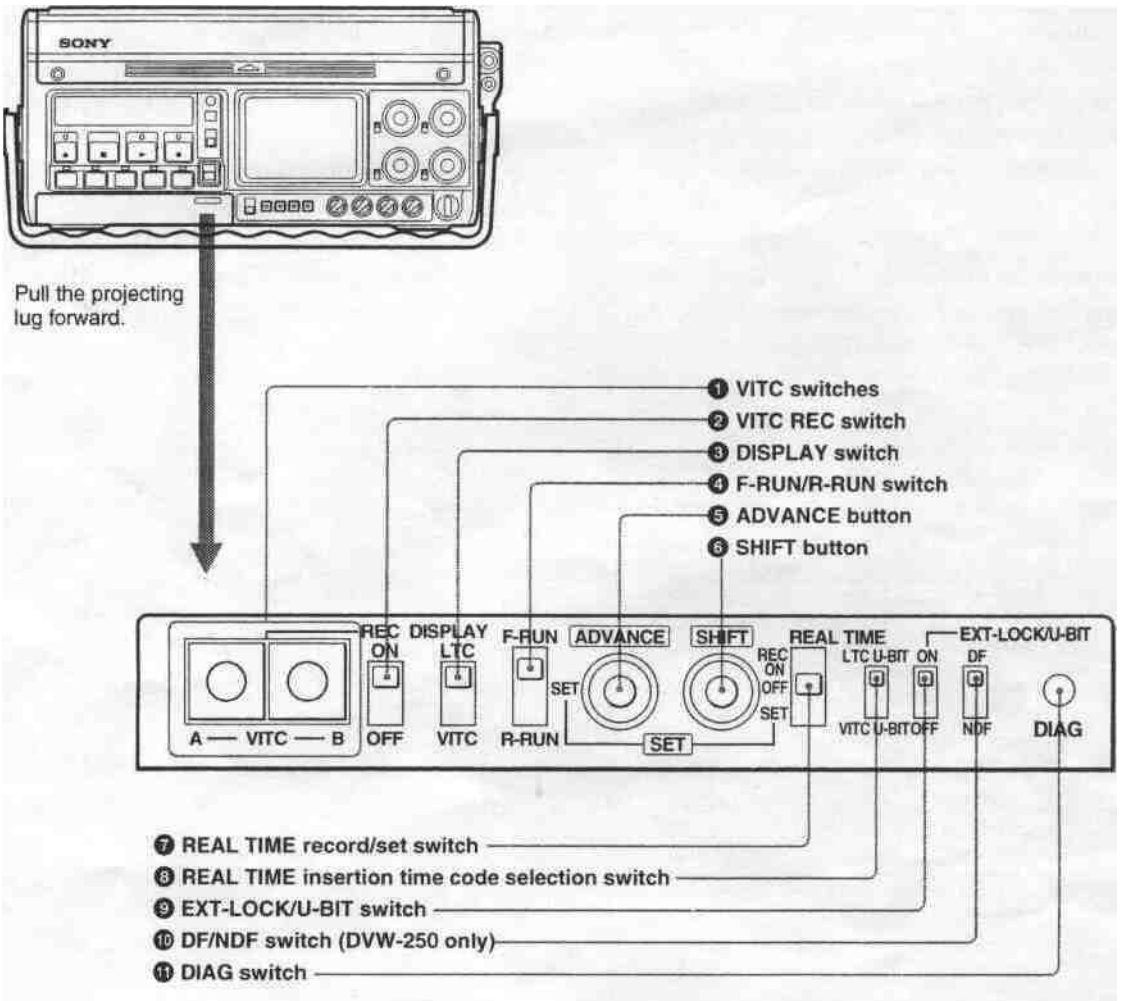
❻ POWER switch

This powers the unit on and off.

This switch also controls the power supply to a camera connected to the CAMERA connector on the connector panel *(see page 2-13)*, a remote controller connected to the DC OUT connector *(see page 2-15)*, and an RF modulator connected to the RFU OUT connectors *(see page 2-15)*.

Note that the time code circuits continue to operate when the unit is powered off.

2-1-4 Time Code Setting Controls



Time code setting controls

❶ VITC switches

These determine the lines in the vertical blanking interval in which the VITC" is recorded.

For the DVW-250, the factory default is for switch A to be in position 6 (line 16) and switch B in position 8 (line 18).

For the DVW-250P, the factory default is for switch A to be in position C (line 19) and switch B in position E (line 21).

For details of the relation between the switch positions and the line numbers, see page 4-10.

❷ VITC REC (record) switch

This selects whether or not to record the VITC.

ON: Record the VITC.

OFF: Do not record the VITC.

1) VITC (Vertical Interval Time Code)

This time code signal is inserted in two lines of the vertical blanking interval. This allows the time code to be read even at very slow playback speeds.

❸ DISPLAY switch
This selects which time code is displayed in the status indication panel *(see page 2-4).* This switch is only effective when the DISPLAY switch by the status indication panel *(see page 2-5)* is set to the TC or U-BIT position.
LTC: Display the LTC (Longitudinal Time Code).
VITC: Display the VITC.

❹ F-RUN/R-RUN (free-run/record-run) switch
This selects the operating mode of the internal time code generator.
F-RUN: The time code generator keeps running, regardless of the operating state of the unit. Use this position when setting the time code to real time or synchronizing it to an external time code.
SET: Move the switch to this position when setting the time code or user bits value.
R-RUN: The time code generator runs only while recording. This produces a tape with consecutive time code values, even when shot intermittently.

❺ ADVANCE button
When setting the time code or user bits value, pressing this button increments the digit which is flashing.
This button is effective only when the F-RUN/R-RUN switch or REAL TIME record/set switch is in the SET position.

❻ SHIFT button
When setting the time code or user bits value, pressing this button cycles through the digits, flashing the one which can be changed. This button is effective only when the F-RUN/R-RUN switch or REAL TIME record/set switch is in the SET position.

❼ REAL TIME record/set switch
This selects whether or not to record the real time as user bit data. It is also used for setting the real time.
REC ON: Record the real time as user bit data.
OFF: Do not record the real time as user bit data.
SET: Set the real time.

❽ REAL TIME insertion time code selection switch
This selects whether to insert the real time as user bit data in the LTC or VITC.
LTC U.BIT: Insert the user bit value in the LTC.
VITC U-BIT: Insert the user bit value in the VITC.

❾ EXT-LOCK/U-BIT switch
This selects whether or not to lock the user bit data to external user bit data.
ON: The user bit value is locked to the user bit value inserted in the external time code.
OFF: The user bit value set on this unit is used.

❿ DF/NDF switch (DVW-250 only)
This selects whether to use drop frame mode or non-drop frame mode.

For an explanation of the significance of these modes, see the footnotes on page 4-9.

DF: drop frame mode
NDF: non-drop frame mode

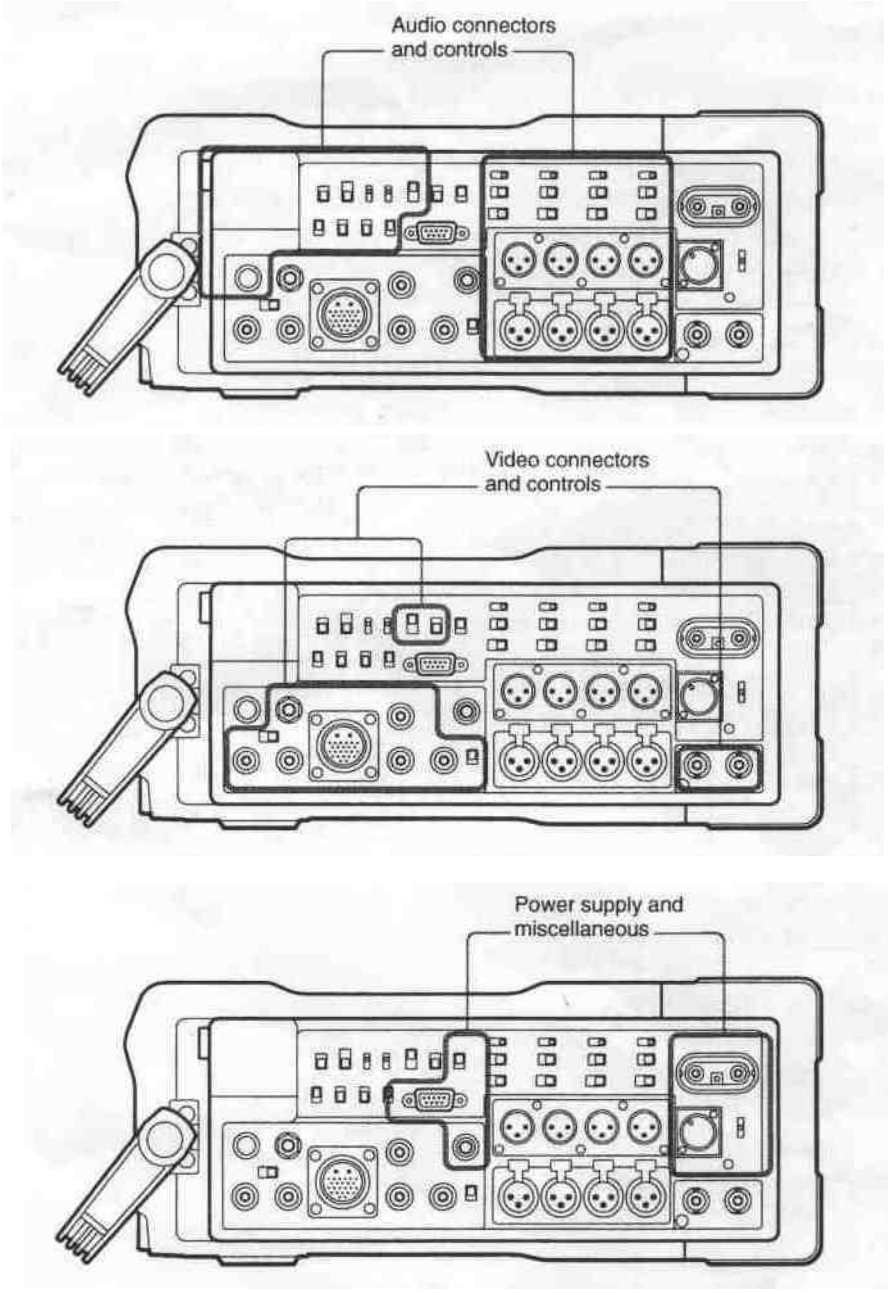
⓫ DIAG (diagnosis) switch
Press this switch to carry out diagnosis on the unit.

For details, refer to the supplied Maintenance Manual Part 1.

2-2 Connector Panel

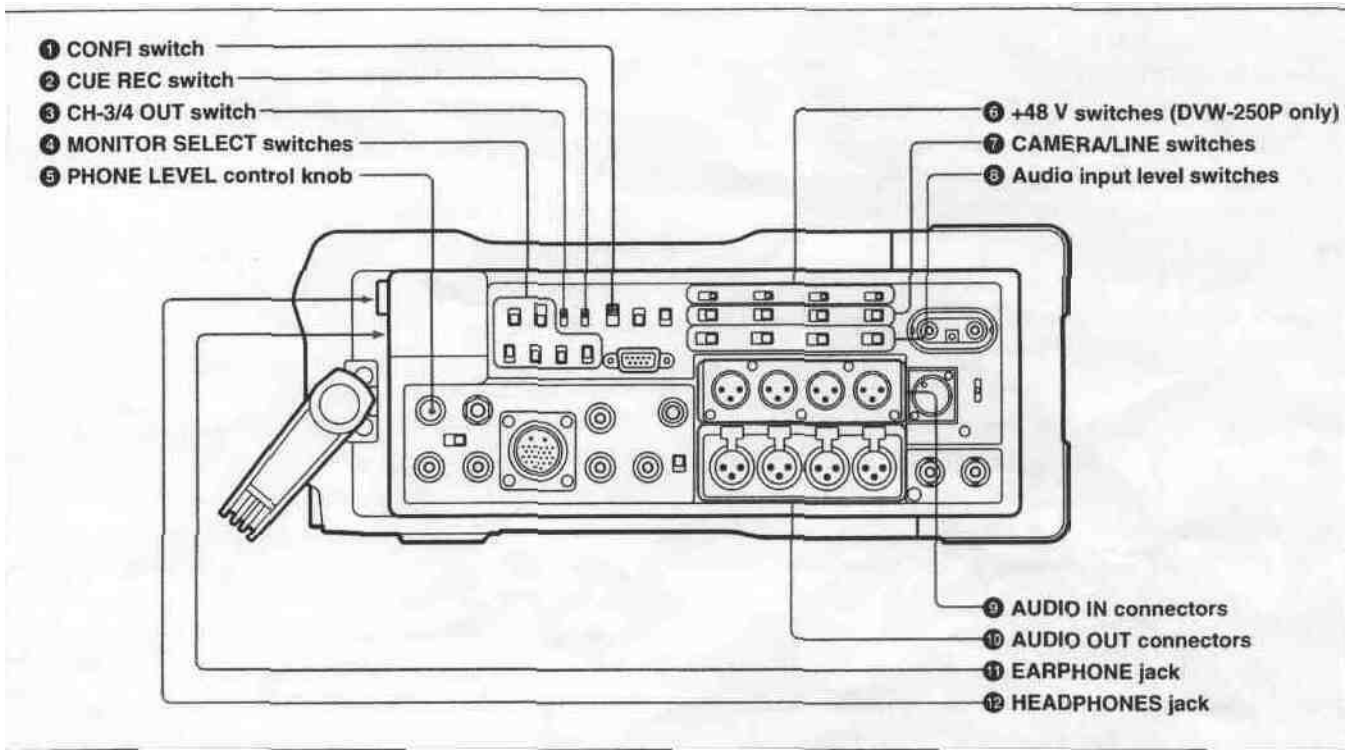
This section describes the connector panel under the following three headings:

- Audio connectors and controls
- Video connectors and controls
- Power supply and miscellaneous



Connector panel

2-2-1 Audio Connectors and Controls


❶ CONFI switch
❷ CUE REC switch
❸ CH-3/4 OUT switch
❹ MONITOR SELECT switches
❺ PHONE LEVEL control knob
❻ +48 V switches (DVW-250P only)
❼ CAMERA/LINE switches
❽ Audio input level switches
❾ AUDIO IN connectors
❿ AUDIO OUT connectors
⓫ EARPHONE jack
⓬ HEADPHONES jack

Audio connectors and controls

❶ CONFI (confidence) switch

This selects the mode for monitoring during recording. Note that this switch applies to both video and audio.

ON: Monitor the simultaneous playback of the recorded signals from the confidence heads.

ECC (Error Correcting Codes): Monitor the input signals unchanged (in E-E mode). If a serious error is detected while recording the signals, a warning indication is given.

OFF: Monitor the input signals unchanged (in E-E mode). The RF envelope is monitored during recording, and if a fault occurs a warning indication is given.

The ON setting results in the highest power consumption, and the OFF setting the lowest. When using the unit with a battery pack, set the CONFI switch to the ECC or OFF position.

❷ CUE REC (record) switch

It is possible to mix the analog audio input signals and record them on the analog cue track on the tape. This switch determines whether or not to record on the cue track during normal recording. When this switch is in the ON position, channels 1 to 4 of the analog audio input are mixed and recorded on the cue track. When using the CUE DUB button on the front panel *(see page 2-3)* for cue dubbing, the audio signal is recorded on the cue track regardless of the position of this switch.

❸ CH-3/4 (channels 3 and 4) OUT switch

This selects the output from channels 3 and 4 of the AUDIO OUT connectors.

MON: the signals selected by the MONITOR SELECT switches

LINE: the signals of audio channels 3 and 4

❹ MONITOR SELECT switches

These select the audio signals which can be monitored using the EARPHONE jack, HEADPHONES jack, and RFU OUT connector. When the CH-3/4 OUT switch is in the MON position, these switches also select the audio output from channels 3 and 4 of the AUDIO OUT connectors.

CUE: the audio from the cue track

DA: Use the channels selected by the switch to the right.

1/2: audio channels 1 and 2

3/4: audio channels 3 and 4

MIX: A mix of those of the four channels for which the corresponding switches below are in the ON position.

2-2 Connector Panel

❺ PHONE LEVEL control knob
This adjusts the level of audio output to the EARPHONE and HEADPHONES jacks.

❻ +48 V switches (DVW-250P only)
For each of the four channels, these turn on or off the 48 V microphone phantom power supply to the corresponding AUDIO IN connector. These switches are only effective when the following selections are made:
CAMERA/LINE switch: CAMERA position
Audio input level switch: -60 dB position

❼ CAMERA/LINE switches
For each of the four audio channels, these select the input.
CAMERA: the audio input to the CAMERA connector *(see next page)*
LINE: the audio input to the corresponding AUDIO IN connector

❽ Audio input level switches
For each of the four channels, these select the audio input level. There are three settings: -60, -20 and +4 dBu.

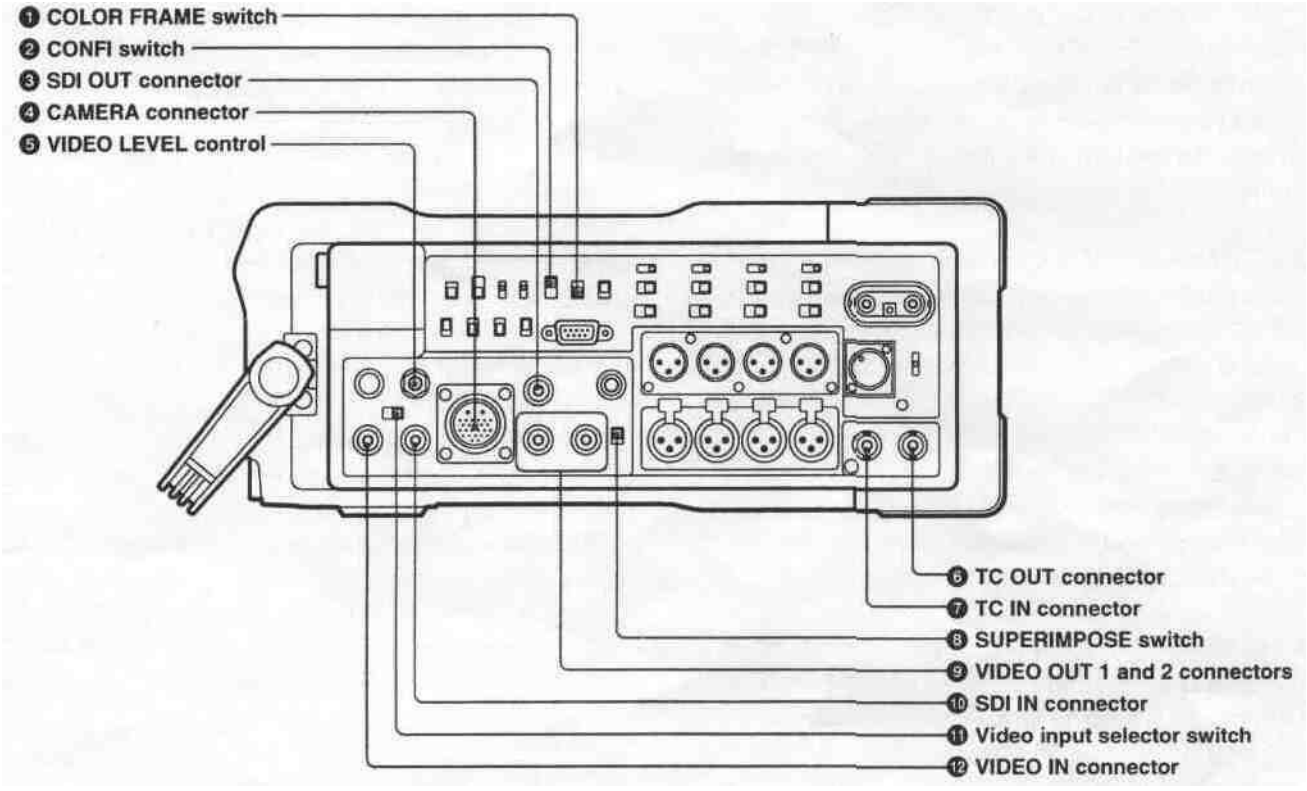
❾ AUDIO IN connectors (XLR in)
These input up to four analog audio signals from external microphones or other equipment.

❿ AUDIO OUT connectors
These output analog audio signals for the four channels to external equipment.

⓫ EARPHONE jack (stereo **minijack)**
Connect an earphone or stereo headphones equipped with a stereo miniplug.
The MONITOR SELECT switches determine the audio output.
When the WARNING indicator *(see page 2-5)* lights or flashes, a warning sound is sent to the earphone.

⓬ HEADPHONES jack (stereo standard jack)
Connect stereo headphones with an impedance of 8 ohms.
The MONITOR SELECT switches determine the audio output.
When the WARNING indicator *(see page 2-5)* lights or flashes, a warning sound is sent to the headphones.

2-2-2 Video Connectors and Controls


❶ COLOR FRAME switch
❷ CONFI switch
❸ SDI OUT connector
❹ CAMERA connector
❺ VIDEO LEVEL control
❻ TC OUT connector
❼ TC IN connector
❽ SUPERIMPOSE switch
❾ VIDEO OUT 1 and 2 connectors
❿ SDI IN connector
⓫ Video input selector switch
⓬ VIDEO IN connector

Video connectors and controls

❶ COLOR FRAME switch

This selects whether or not to enable color framing during editing or playback.

ON: Enable color framing. Playback is always in units of four (NTSC) or eight (PAL) fields.

OFF: Disable color framing. Playback is in units of two fields.

❷ CONFI (confidence) switch

This selects the mode for monitoring during recording Note that this switch applies to both video and audio.

ON: Monitor the simultaneously playback of the recorded signals from the confidence heads.

ECC (Error Correcting Codes): Monitor the input signals unchanged (in E-E mode). If a serious error is detected while recording the signals, a warning indication is given.

OFF: Monitor the input signals unchanged (in E-E mode). The RF envelope is monitored during recording, and if a fault occurs a warning indication is given.

The ON setting results in the highest power consumption, and the OFF setting the lowest. When using the unit with a battery pack, set the CONFI switch to the ECC or OFF position.

❸ SDI (Serial Digital Interface) OUT connector (BNC)

This outputs serial digital video and audio signals in Dl format.

It is possible to switch this output on or off using item "SDI OUT" in the <VIDEO 2> menu *(see page 6-3).*

❹ CAMERA connector (26-pin)

Connect this to the multi-pin connector on the camera. This interface carries video, audio and control signals between the camera and the unit, and also supplies power to the camera.

When the video input selector switch is in the CAMERA position, the signals supplied to this connector form the video input to the unit. When item "CAMERA" in the <VIDEO 1> menu is set to "AUTO" *(see page 6-3),* it is possible to input either analog component video signals or Dl format serial digital video and audio signals, depending on the type of camera connected.

2-2 Connector Panel

❺ VIDEO LEVEL control
If the composite signal input level to the VIDEO IN connector is not a 1 Vp-p signal, use a screwdriver to turn this control and adjust the input level. The range of adjustment is ±3 dB. Normally leave this control at the center detent position.
It is not possible to adjust the input level for component signals or serial digital video and audio signals.

❻ TC (time code) OUT connector (BNC)
Connect to the time code input connector of an external device such as a time code reader or VTR. The time code output depends on the operating state of the unit, as follows:

Playback: playback time code

Recording: time code generated by the built-in time code generator. When the time code on this unit is locked to an external time code, the external time code is output.

❼ TC (time code) IN connector
Connect to the time code output connector of an external device such as a time code generator or VTR. Use this when locking the built-in time code generator to the external time code.

❽ SUPERIMPOSE switch
This selects whether or not to superimpose information about the state of the unit (PLAY, FF, etc.) and time code values on the composite video signal output from the VIDEO OUT 2 connector.

ON: Superimpose information.

OFF: Do not superimpose information.

❾ VIDEO OUT 1 and 2 connectors (BNC)
These connectors provide analog, composite video outputs. When the SUPERIMPOSE switch is in the ON position, information about the state of the unit and time code values are superimposed on the signal output from the VIDEO OUT 2 connector.

❿ SDI IN connector
Input serial digital video and audio signals in Dl format. When the video input selector switch is in the SDI IN position, the signals supplied to this connector form the video input to the unit.

⓫ Video input selector switch
The position of this switch determines the video input to the unit.

VIDEO IN: composite video signal input to the VIDEO IN connector

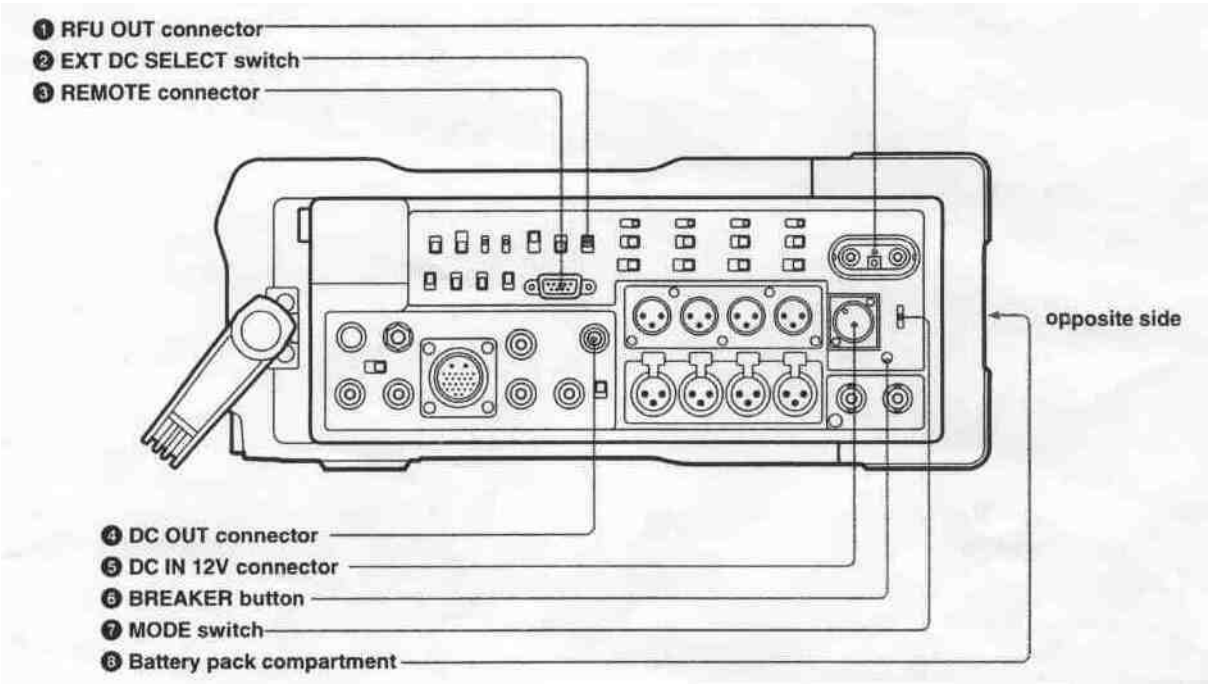
CAMERA: component video signal or serial digital video signal input to the CAMERA connector

SDI IN: serial digital video signal input to the SDI IN connector

The playback signal from this unit is synchronized to the signal selected by this switch.

⓬ VIDEO IN connector (BNC)
Input an analog composite video signal. When the video input selector switch is in the VIDEO IN position, the signals supplied to this connector form the video input to the unit.

2-2-3 Power Supply and Miscellaneous



Power supply and miscellaneous

❶ RFU OUT connector
This outputs video and audio signals and a power supply to an RF modulator such as an RFU-95UC. Connect to the input connector of the RF modulator.

❷ EXT (external) DC SELECT switch
This selects the way in which the external power supply (to the DC IN 12V connector) is used.

AUTO: The external power supply is normally used, but if the voltage drops, the unit switches automatically to the internal battery pack.

FIX; The external power supply is always used.

❸ REMOTE connector (9-pin)
Connect to an external device to remote-control the unit, as required.

❹ DC OUT connector
Connect the DC power cable of the BVR-3 Remote Controller. This provides a 12 V DC power supply to the remote controller.

❺ DC IN 12V connector **(XLR** 4-pin, male)
When using an AC-550/550CE AC Adaptor to connect to an AC power supply, connect the DC cable of the adaptor to this connector.

❻ BREAKER button
If an excess current flows within the unit, the breaker operates to shut off the power, and this button jumps out.
Check the internal circuitry of the unit, and check that there is no persisting fault. Then press in this button. If the system is able to operate normally, the power will be restored.

❼ MODE switch
This controls the operating mode, making it possible to control the power consumption.

SAVE: The power consumption is considerably reduced. Use this mode when operating with a battery pack.

PB/EE: When the tape is stopped, and while fast forwarding and rewinding, signals are output in E-E mode.

PB: Even when the tape is stopped, and during fast forward and rewind operations, the video and audio signals recorded on the tape are output.

❽ Battery pack compartment
Insert the battery pack (BP-90A or BP-L60). The battery pack compartment is behind the cover on the opposite side from the connector panel.

3-1 Power Supply

This unit can operate from any of the following power sources:
- BP-90A nickel-cadmium battery pack
- BP-L60 lithium ion battery pack
- Supply to the DC IN 12V connector, for example using an AC-550/550CE AC Adaptor.

3-1-1 Using a Battery Pack

Using a BP-90A Battery Pack

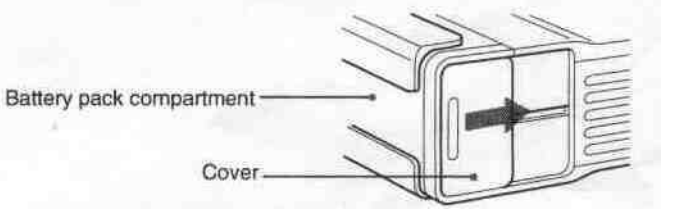
A BP-90A Battery Pack provides about two hours of continuous recording (when the unit is operated with the MODE switch in the SAVE position, the CONFI switch in the OFF position, and the setup menu item "SDI OUT" set to "OFF").
Before use, charge the battery pack using a BC-410/410CE Battery Charger. Charging takes about two hours thirty minutes.

For details of charging, see the instructions provided with theBC-410/410CE.

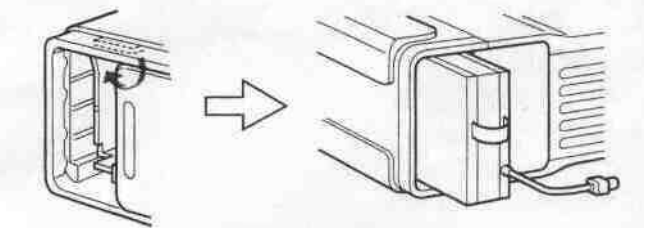
Inserting the BP-90A Battery Pack

Use the following procedure.
The adhesive label bound into the end of this book gives directions for replacing the battery pack. You can attach it to the cover of the battery pack compartment for reference.

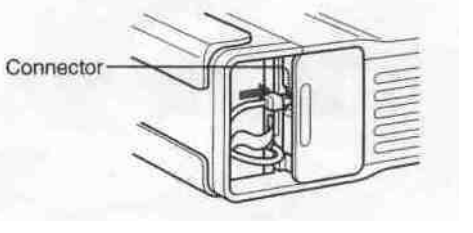
1 Open the cover of the battery pack compartment.



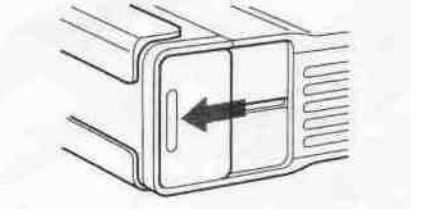
2 Fold down the upper and lower divider grids inside the battery compartment by pulling down the upper one, then insert the battery pack with the end with the lead attached toward you.



3 Plug the lead into the connector inside the battery pack compartment, and tuck the lead completely into the compartment.



4 Close the cover of the battery pack compartment.



Using a BP-L60 Battery Pack

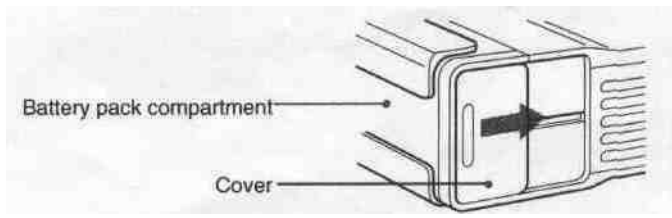
A BP-L60 Battery Ppack provides about two hours of continuous recording (when the unit is operated with the MODE switch in the SAVE position, the CONFI switch in the OFF position, and the setup menu item "SDI OUT" set to "OFF").
Before use, charge the battery pack using a BC-L100/ L100CE battery charger. Charging takes about two hours thirty minutes.

For details of charging, see the instructions provided with the BC-L100/L100CE.

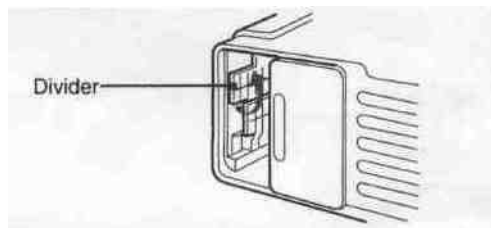
Inserting the BP-L60 Battery Pack

Use the following procedure.
The adhesive label bound into the end of this book gives directions for replacing the battery pack. You can attach it to the cover of the battery pack compartment for reference.

1 Open the cover of the battery pack compartment.

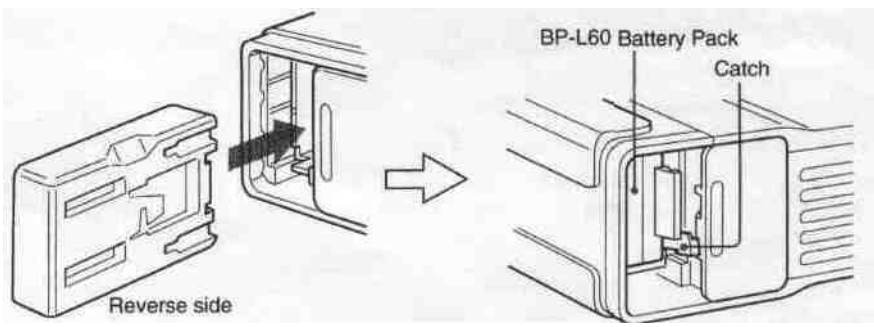


2 Pull up the internal divider grids.

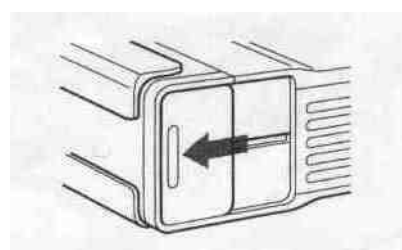


3 Insert the battery pack with its reverse side on the inside, and push until it clicks into place.

When the battery pack is inserted correctly, the catch automatically engages to lock it in place.

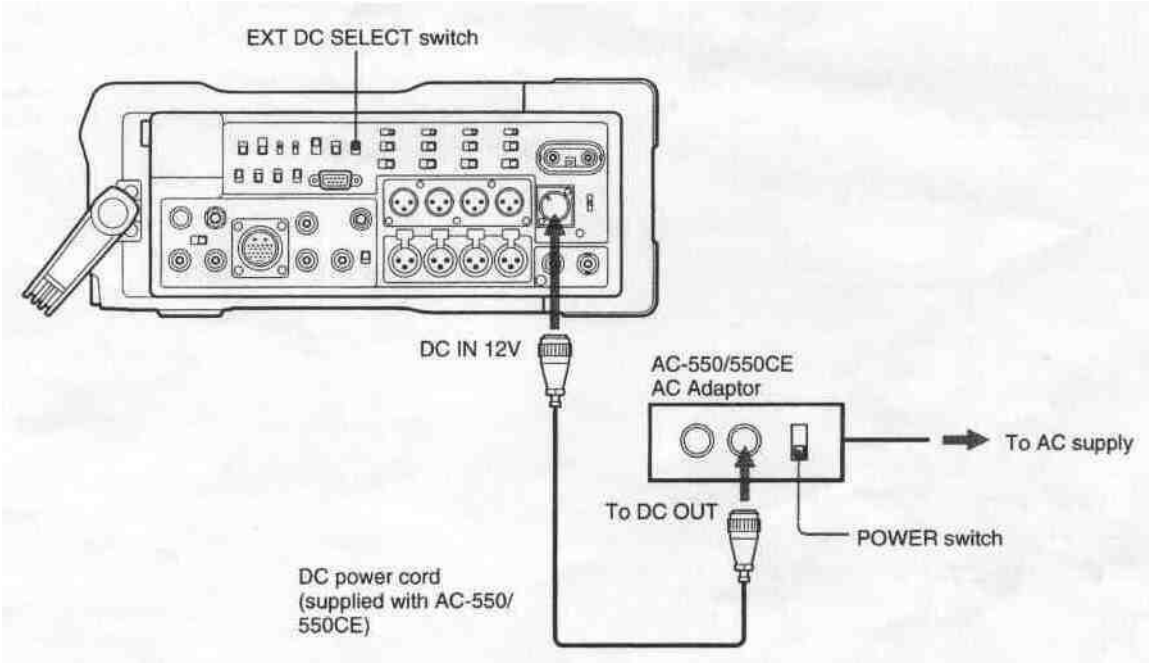


4 Close the cover of the battery pack compartment.



3-1-2 Using an AC Power Supply

Use the following procedure to power the unit from an AC supply.



Using an AC power supply

1 Turn the POWER switch of the DVW-250/250P off.

2 Connect the DC IN 12V connector of the DVW-250/250P to an AC supply through the AC-550/550CE AC Adaptor, as shown in the figure.

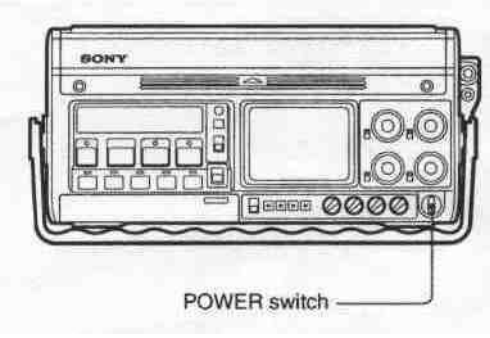
3 Set the EXT DC SELECT switch according to the way in which you wish to use the AC supply.
AUTO: If the voltage of the AC supply drops, the unit switches automatically to the internal battery pack.
FIX: Only the external power supply is used.

4 Turn the POWER switch of the AC adaptor on.

Note

While an AC power supply is connected, then regardless of the state of the POWER switch on the DVW-250/250P the time code circuits continue to operate, consuming some power. If not using the unit for a considerable time, disconnect the power cord between the DVW-250/250P and the AC-550/550CE.

3-1-3 Powering On and Off



Powering on and off

Powering on and off

Use the POWER switch on the front panel to power the unit on and off.

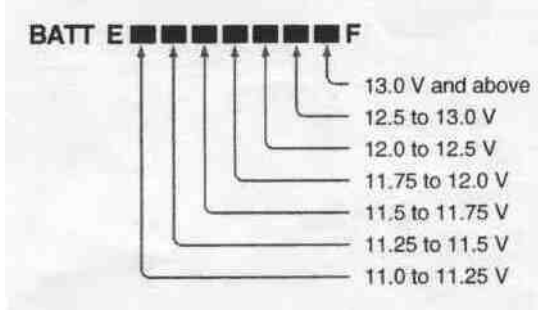
Starting recording automatically at power on

In the SYSTEM 1 setup menu, set the P-ON REC item to ON to start recording automatically at power on.

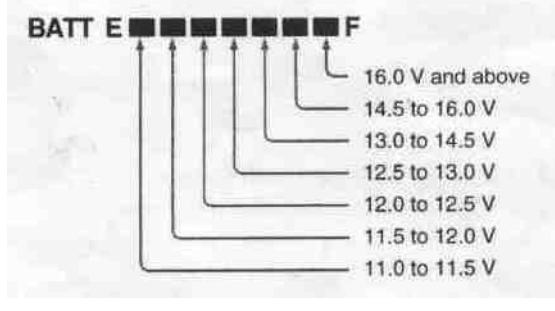
For details, see page 6-4.

3-1-4 Checking the Remaining Battery Capacity

Check the remaining battery capacity in the status indication panel.
When the battery pack is fully charged (supply voltage at least 13 V for the BP-90A or 16 V for the BP-L60), all seven display segments appear.
The relation between the number of displayed segments and the battery pack voltage is shown in the following figure.



Display segments and battery pack voltage
(Using BP-90A or external power supply)



Display segments and battery pack voltage (Using BP-L60)

As the battery capacity is used up, the segments disappear in turn from the right.
When the battery pack is almost exhausted, the leftmost segment and the "BATT" and "E" indications flash, and simultaneously the WARNING indicator flashes, accompanied by an intermittent warning tone.
When the battery pack is completely exhausted, the WARNING indicator stays on, and the warning tone becomes continuous.

3-2 Cassettes

This section lists the cassettes which can be used, and provides guidance on their handling.

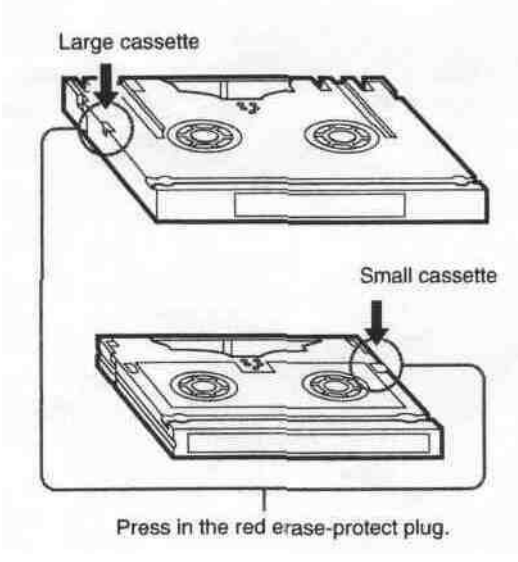
3-2-1 Cassette Types

This unit uses Digital Betacam cassettes with a 1/2-inch tape width for playback and recording. The following are the type numbers of the cassettes you can use.

Small cassettes	Large cassettes
BCT-D6	BCT-D34L
BCT-D12	BCT-D64L
BCT-D22	BCT-D94L
BCT-D32	BCT-D124L
BCT-D40—	

3-2-2 Preventing Accidental Erasure of Recordings

To prevent a tape from being erased, press in the red erase-protect plug on the reverse side of the cassette. Return this plug to its original position to be able to record on the tape again.

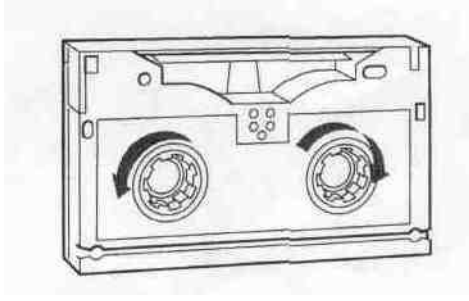


Preventing accidental erasure

3-2-3 Loading and Unloading Cassettes

Checking that there is no slack in the tape

Before loading a cassette, press in the reels with your fingers, and turn gently in the directions shown by the arrows. If the reels do not turn, there is no slack.

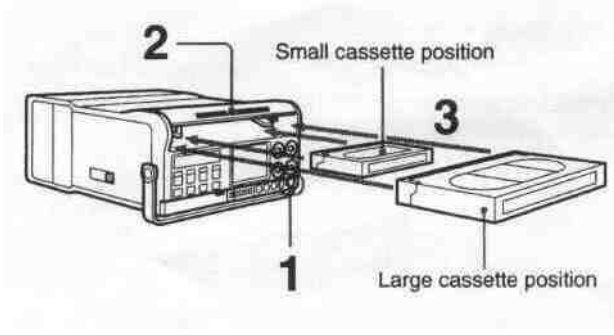


Checking for slack in the tape

3-2 Cassettes

Loading a cassette

It is not possible to load a cassette unless the unit is powered on.



Loading a cassette

1 Turn the POWER switch on.

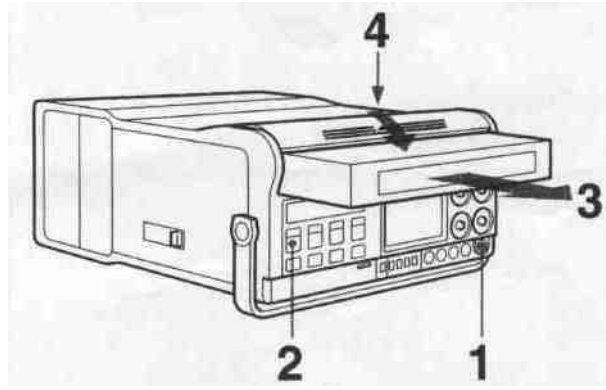
2 Raise the lid of the cassette compartment.

3 Check that the "HUMID" indication is not showing in the status indication panel, then insert the cassette.

For details of the procedure when the "HUMID" indication is showing, see the section "Warning Indications " (page A-l).

When the cassette is fully inserted, the lid of the cassette compartment closes automatically.

Ejecting a cassette



Ejecting a cassette

1 Check that the unit is powered on.

2 Press the EJECT button.

This ejects the cassette.

3 Remove the cassette.

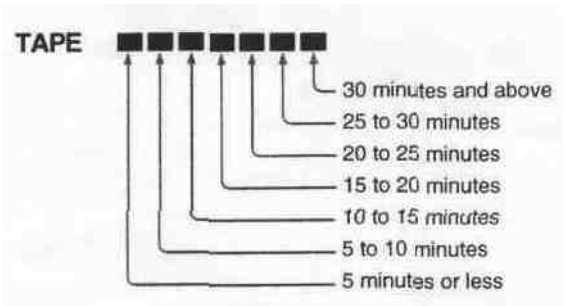
4 Close the lid of the cassette compartment manually.

Ejecting a cassette when the unit cannot be powered on

When there is no power supply, for example because the battery pack is exhausted, to eject a cassette manually refer to the supplied Maintenance Manual Part1.

3-2-4 Checking the Remaining Tape

When a tape is loaded, the "TAPE" indication appears in the status indication panel, and the seven segments flash.
When the tape transport starts, the display continues to flash for several seconds, then the segments switch to displaying the amount of tape remaining. When this is 30 minutes or more all seven segments appear. When less tape remains, each segment corresponds to 5 minutes of remaining tape.
The relation between the number of displayed segments and the tape remaining is shown in the following figure.

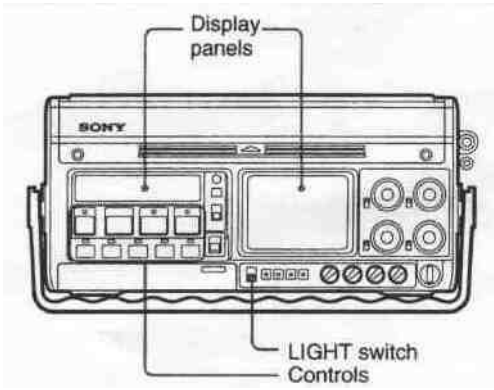


Display segments and remaining tape time

When the remaining tape time is approximately two minutes, the leftmost segment and the "TAPE" indication flash, and simultaneously the WARNING indicator flashes, accompanied by an intermittent warning tone. At the end of the tape, the WARNING indicator stays on, and the warning tone becomes continuous.

3-3 Adjusting the Display and Indicator Brightness

Depending on the environmental conditions, it is possible to adjust the brightness of the display panels and indicators.



Adjusting the brightness of the display panels and indicators

In a dark environment

If the displays and indicators are hard to see because of low lighting conditions, move the LIGHT switch on the front panel to the ON position to switch on the backlighting.

In a bright environment

If the indicators in the operating buttons are hard to see because the lighting is too bright, set the LIGHT switch to the BRT position. This increases the intensity of the indicators.

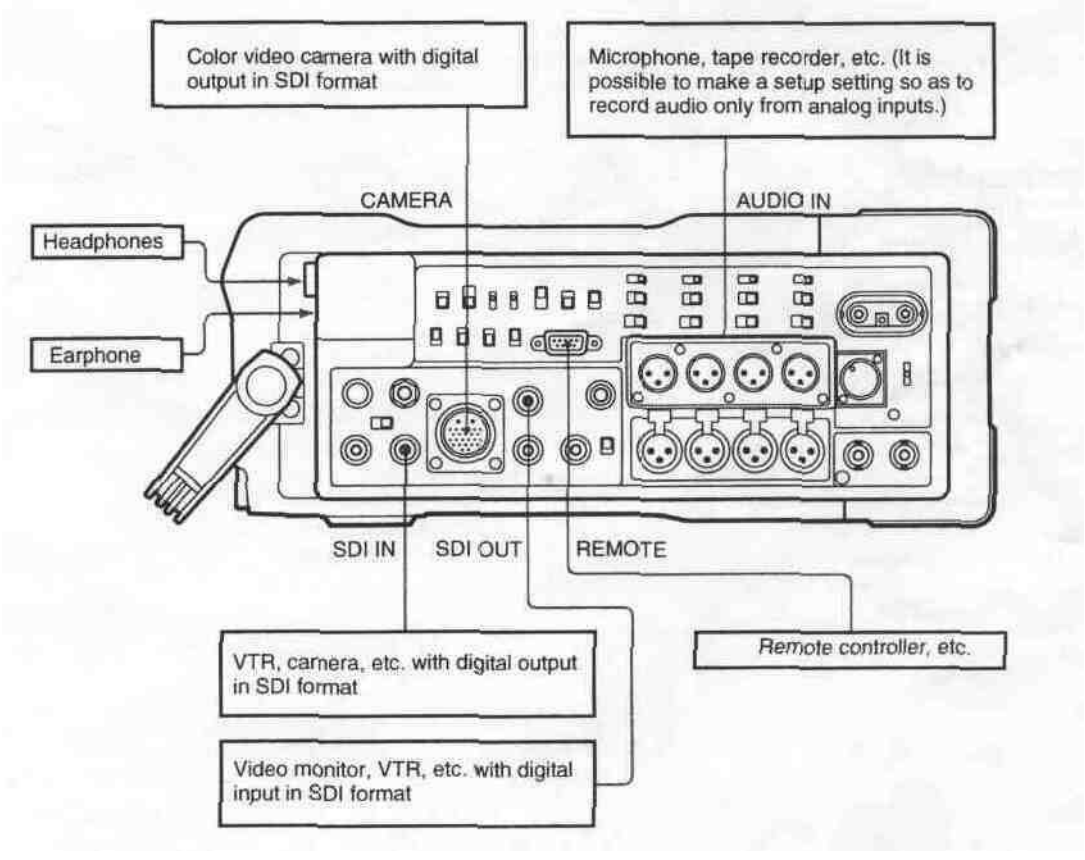
Unless lighting conditions require either of these settings, leave the LIGHT switch in the OFF position.

4-1 Preparations for Recording

This section describes the connections and adjustments necessary before actually carrying out recording.

4-1-1 Connecting Digital Equipment

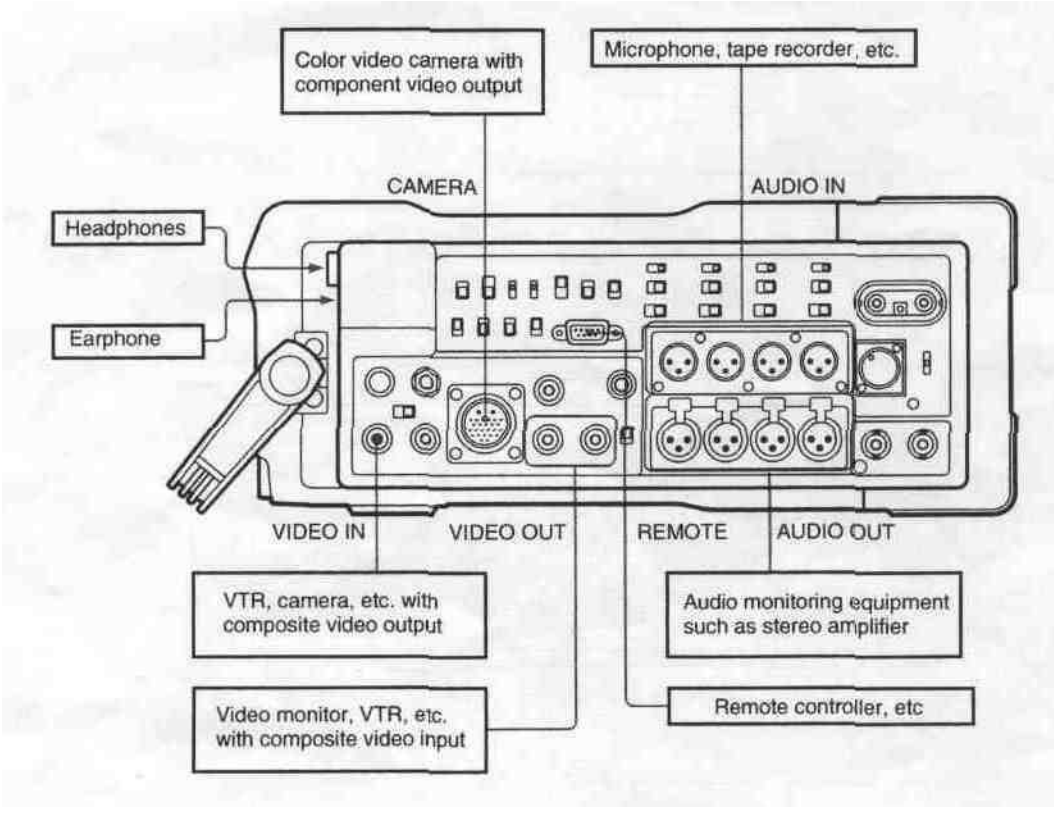
The following figure shows an example of the connections required when using this unit with a camera, VTR, video monitor and other equipment fitted with digital inputs and outputs in the SDI (Serial Digital Interface) format.


Color video camera with digital output in SDI format
Microphone, tape recorder, etc. (It is possible to make a setup setting so as to record audio only from analog inputs.)
CAMERA
AUDIO IN
Headphones
Earphone
SDI IN
SDI OUT
REMOTE
VTR, camera, etc. with digital output in SDI format
Remote controller, etc.
Video monitor, VTR, etc. with digital input in SDI format

Connecting digital equipment

4-1-2 Connecting Analog Equipment

The following figure shows an example of the connections required when using this unit with a camera, VTR, video monitor and other equipment fitted with analog inputs and outputs.



Connecting analog equipment

4-1-3 Making Video Input Settings

Selecting the input video signal

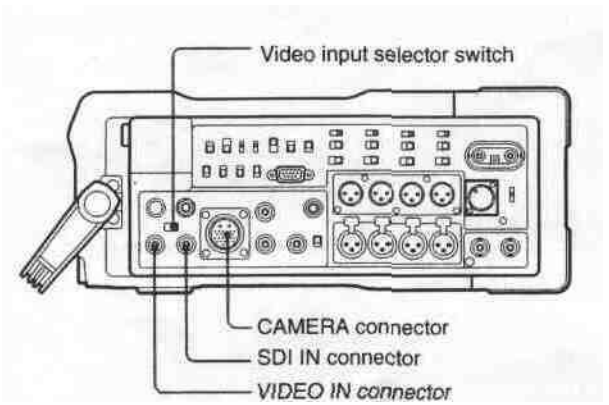
This unit accepts three different types of video input signals, selected by the video input selector switch as follows:

- To select a composite video signal input to the VIDEO IN connector, select the left position (VIDEO IN).
- To select the signal input to the CAMERA (26-pin) connector, select the center position (CAMERA). There is a setup menu operation to select between using analog (Y/R-Y/B-Y) or digital signals. It is also possible to set the unit to determine the type automatically from the type of camera connected.

For details of the setup menu operation, see Section 6-3 "Setup Menu Settings, " item "CAMERA" in the <VIDEO 1> menu (page 6-3).

- To select serial digital video and audio signals input to the SDI IN connector, select the right position (SDI IN).
  The SDI format includes audio signals, but there is a setup menu operation to determine whether to use these as the audio input, or to use separate analog inputs.

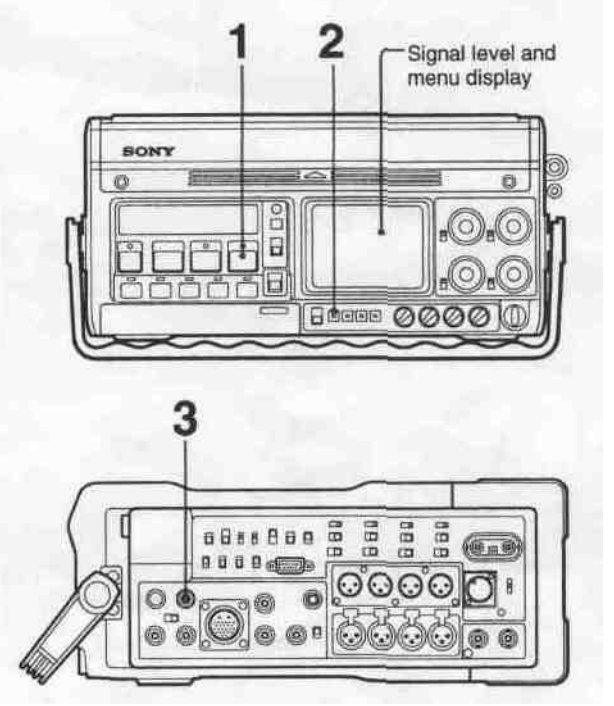
For details of the setup menu operation, see Section 6-3 "Setup Menu Settings, " items "INPUT 1/2" and "INPUT 3/4" in the <AUDIO> menu (page 6-4).



Selecting the input video signal

Displaying and adjusting the video input levels

It is possible to check the video input levels, using the level meters.



Displaying and adjusting the video input levels

1 Press the REC button.

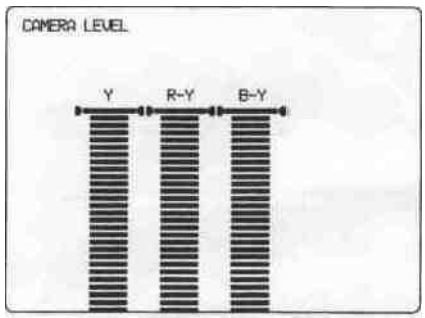
The unit switches to the E-E mode.

2 Press the DISPLAY button in the adjustment controls.

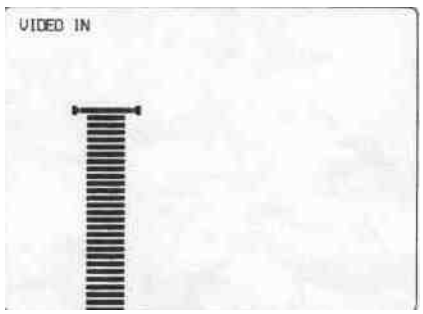
Pressing the DISPLAY button cycles the display through the audio level meters, video level meters, and setup menus.
If the display is showing the video level meters or setup menus, and five minutes elapse without an operation, the display automatically reverts to the audio level meters.

(Continued)

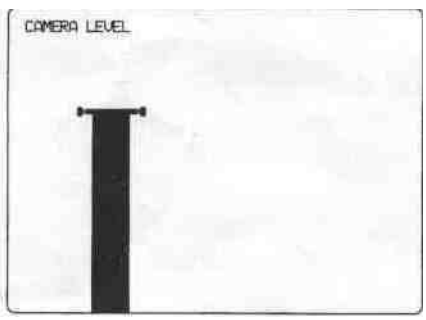
• When the input signal is component video, the meters indicate the Y, R-Y, and B-Y levels. The maximum values for R-Y and B-Y correspond to a 75 % color bar signal.



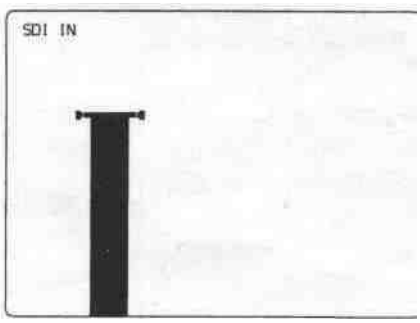
•When the input signal is analog composite video, the meter indicates the sync signal level.



• When the input signal is digital in SDI format, the display indicates whether or not a signal is present.



Signal input to CAMERA connector



Signal input to SDI IN connector

3 If the input level of a composite signal is not 1 Vp-p signal, use a screwdriver to turn the VIDEO LEVEL control to adjust the input level.

Note

It is not possible to adjust the input level of signals other than composite video.

4-1-4 Making Audio Input Settings

Selecting the input audio signals

Select the input audio signals as follows:

When the video input is digital

When the video input signal is digital in SDI format, it is possible to select in a setup menu whether to use the audio signals included in the SDI signal, or analog signals input to the AUDIO IN or CAMERA connectors. The settings for channels 1 and 2 and for channels 3 and 4 are independent.

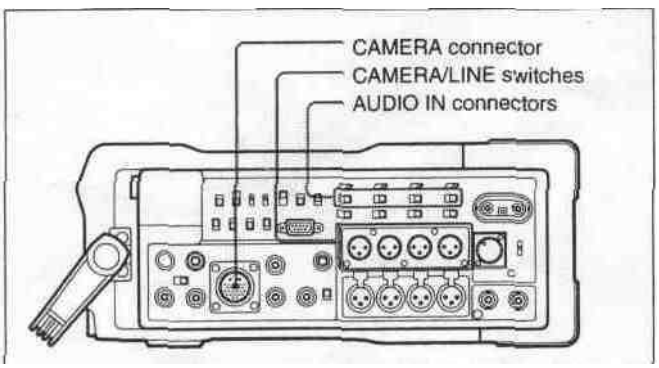
For details of the setup menu operation, see Section 6-3 "Setup Menu Settings," items "INPUT 1/2" and "INPUT 3/4" in the <AUDIO> menu (page 6-4).

When the "ANALOG" setting is selected, choose the audio input signal in the same way as for analog video input signals.

When the video input is analog

If the video input is analog, regardless of the setup menu settings, the audio input is also analog. Use the CAMERA/LINE switches to select the analog signals for the audio input.

- To select the audio signal input to the CAMERA connector, move the switch to the CAMERA position.
- To select the audio signal input to an AUDIO IN connector, move the switch to the LINE position.



Selecting the input audio signals

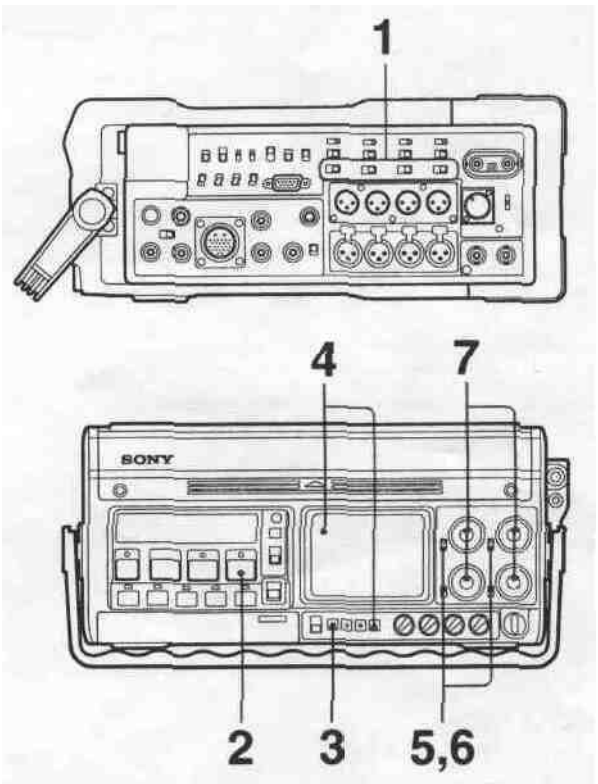
Recording the same audio signals on channels 3 and 4 as on channels 1 and 2

By means of a setup menu setting, it is possible to record the same audio signals on channels 3 and 4 and channels 1 and 2.

For details of the setup menu operation, see Section 6-3 "Setup Menu Settings," item "DOUBLE REC" in the <AUDIO> menu (page 6-4).

Adjusting the recording levels

For analog audio inputs, it is possible to adjust the recording level.



Adjusting the recording levels

1 Set the audio input level switches to correspond with the input levels.

2 Press the REC button.

The unit switches to the E-E mode.

(Continued)

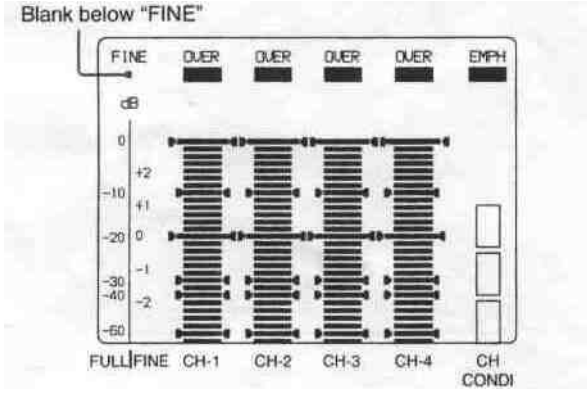
3 If the display is not showing the audio level meters, press the DISPLAY button in the adjustment controls until the audio level meters appear.

Pressing the DISPLAY button cycles the display through the audio level meters, video level meters, and setup menus. If the display is showing the video level meters or setup menus, and five minutes elapse without an operation, the display automatically reverts to the audio level meters.

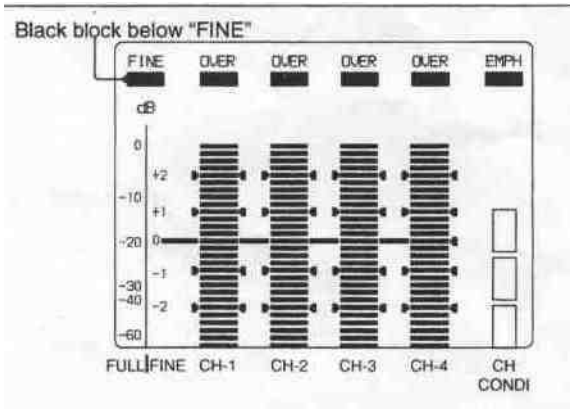
4 Select the level meter display range.

There are two ranges for the audio level meter display, "FULL" (-60 to 0 dB) and "FINE" (-20 ± 2 dB), and pressing the SET button in the adjustment controls toggles between them. The selected mode is shown in the top left comer: in the "FINE" mode, a black block appears below the "FINE" indication; in the "FULL" mode the space below "FINE" is blank.

Select the "FULL" mode first, to make a coarse adjustment.



Display in "FULL" mode



Display in "FINE" mode

5 Set the UNI/VAR switch for the channel to be adjusted to the UNI position.

The input level appears.

6 Switch the UNI/VAR switch to the VAR position.

It is now possible to adjust the audio recording level, while watching the level meter.

7 Turn the recording level control knob to adjust the level.

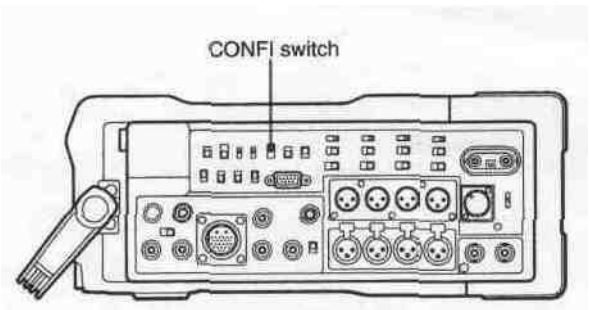
Using the emphasis function

By means of a setup menu setting it is possible to record with emphasis added to the signals input to the AUDIO IN connectors. When emphasis is added, in the audio level meter display a black block appears below the "EMPH" indication.

For details of the setup menu operation, see Section 6-3 "Setup Menu Settings," item "EMPHASIS" in the <AUDIO> menu (page 6-4).

4-1-5 Selecting the Monitoring Mode for Recording

This selection determines the way in which monitoring will be carried out during recording.



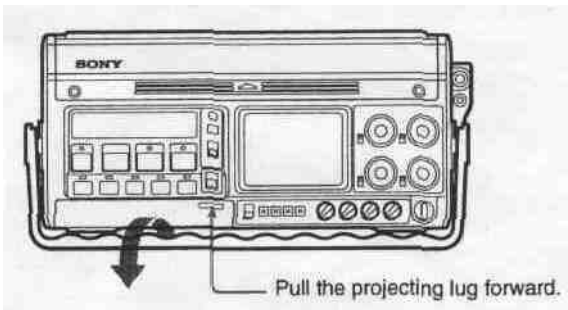
Selecting the monitoring mode for recording

Use the CONFI switch on the connector panel to select the monitored signal.

- To monitor the simultaneous playback of the recorded video and audio signals from the confidence heads, using a video monitor or other equipment connected to the VIDEO OUT connector, set the CONFI switch to the ON position.
- To carry out error detection by means of ECC without direct monitoring of the recorded signals, set the CONFI switch to the ECC position. In this case the monitor output during recording is an E-E signal.
- To carry out no direct monitoring of the recorded signals, and only RF envelope monitoring, set the CONFI switch to the OFF position.
- The OFF setting results in the lowest power consumption, and the ON setting the highest. When using the unit with a battery pack, set the CONFI switch to the ECC or OFF position.

4-1-6 Setting Time Values

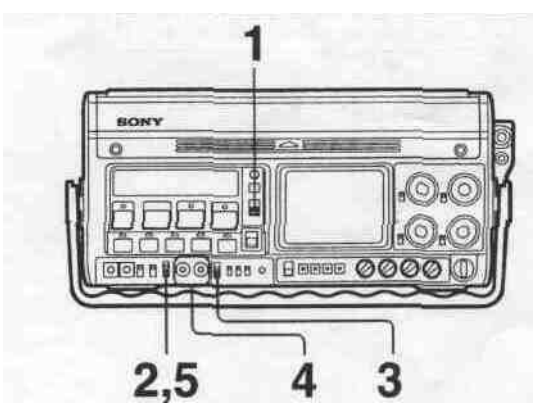
This section describes how to set user bit values, time code values and the real time.
Open the lid covering the time code setting controls as shown in the following figure.



Opening the lid covering the time code setting controls

Setting a constant user bit value

The user bit values recorded on the time code track provide for eight hexadecimal digits, which can be used to hold the date, time, scene number or other information.



Setting the user bit value

1 Set the DISPLAY switch by the status indication panel to U-BIT.

2 Set the F-RUN/R-RUN switch to SET.

3 Set the REAL TIME record/set switch to REC ON or OFF.

4 Use the SHIFT button and ADVANCE button to set the user bit value.
SHIFT button: Cycles through the digits, flashing the digit to be changed.
ADVANCE button: Increments the value of the flashing digit.

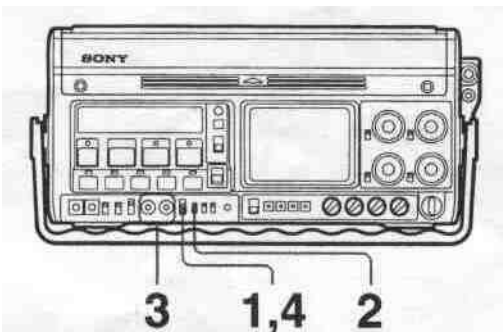
Hexadecimal digits A to F appear in the seven-segment display as follows:

Digit	A	B	C	D	E	F
Display	A	b	C	d	E	F

5 Set the F-RUN/R-RUN switch to F-RUN or R-RUN.

Setting the user bits to reflect the real time

With this setting you can record the real time on the tape.



Setting the user bits to reflect the real time

1 Set the REAL TIME record/set switch to SET.

2 Use the REAL TIME insertion time code selection switch to select which time code to insert the real time user bit value in.
LTC U-BIT: Insert the user bit value in the LTC.
VITC U-BIT: Insert the user bit value in the VITC.

3 Use the SHIFT button and ADVANCE button to set the real time value.
SHIFT button: Cycles through the digits, flashing the digit to be changed.
ADVANCE button: Increments the value of the flashing digit.

- Set the REAL TIME record/set switch to REC ON or OFF.
REC ON: During recording, the real time is recorded in the user bits.
OFF: The real time is not, in fact, recorded in the user bits, but the internal clock continues to operate, keeping the value in step with real time.

Checking the real time

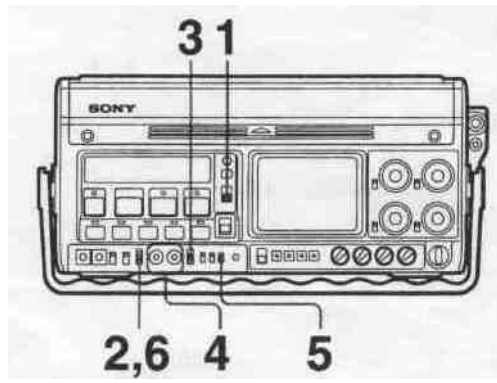
1 Set the DISPLAY switch by the status indication panel to U-BIT.

2 Set the REAL TIME record/set switch to REC ON.

3 Set the DISPLAY switch in the time code setting controls to LTC or VITC.

Whether the real time is being inserted into the LTC or VITC depends on the setting made in step 2 of the procedure for setting the user bits to reflect the real time on the previous page.

Setting the time code value



Setting the time code value

1 Set the DISPLAY switch by the status indication panel to TC.

2 Set the F-RUN/R-RUN switch to SET.

3 Set the REAL TIME record/set switch to REC ON or OFF.

4 Use the SHIFT button and ADVANCE button to set the time code value. The range of values is from 00:00:00:00 to 23:59:59:29 (for NTSC) or 23:59:59:24 (for PAL).
SHIFT button: cycles through the digits, flashing the digit to be changed.
ADVANCE button: increments the value of the flashing digit.

5 On an NTSC system, set the DF/NDF switch appropriately.
DF: Advance the time code in drop frame mode."
NDF: Advance the time code in non-drop frame mode.[2']

6 Set the F-RUN/R-RUN switch to F-RUN or R-RUN.
F-RUN (free-run): The time code advances continuously, regardless of the operating state of the unit. When you select this position, the time code starts advancing immediately.
R-RUN (record-run): The time code advances only during recording. When you select this position, the time code starts advancing only when you start recording.
With the R-RUN selection, the "REC RUN" setting in the <SYSTEM 2> menu *(see page 6-4)* determines whether the time code recorded on the tape is taken from the time code generator or continues from the value previously recorded on the tape.

Time codes and battery pack replacement

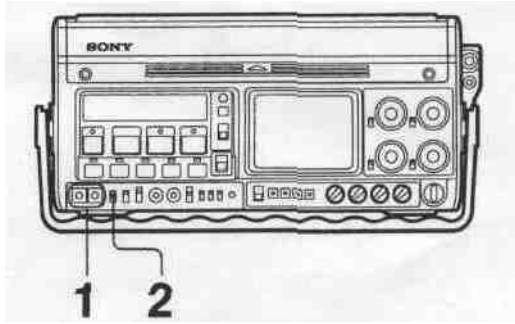
This unit has an internal battery which provides a backup power supply to the time code generator. The time code generator can, therefore continuing running while you change the battery pack. The backup battery lasts for about five years.

1) Drop frame mode
In the NTSC system, the actual frame rate is 29.97 frames per second. There is therefore a cumulative discrepancy between the actual frame rate and the 30 frames per second rate on which time code is based. Drop frame operation refers to the technique of skipping frame numbers at appropriate intervals, to keep the time code values in step with actual elapsed time.

Recording time code and user bits

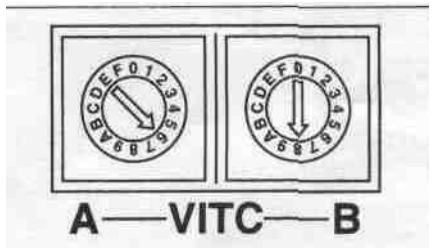
Recording VITC

Use the following procedure to record VITC, including the user bits.



Recording VITC

1 Set the VITC switches in the time code setting controls to select the lines in which the VITC **is** inserted.
Insert the tip of a fine screwdriver into the arrow-shaped slot to turn the switch to the required hexadecimal digit (see table on next page).
You can select the two lines where the time code is to be inserted with the A and B switches.



VITC switches

(Continued)

2) Non-drop frame mode
Non-drop frame time code operation means that the discrepancy between actual elapsed time and 30 frames per second time code values is not corrected.

The relationship between the switch position and the line represented is shown in the following table. The factory default positions are 6 and 8 (for NTSC) and C and E (for PAL) for switches A and B respectively.

Switch position	VITC insertion line No.	
	NTSC	PAL
0	10	—
1	10	—
2	12	9
3	13	10
4	14	11
5	15	12
6	16	13
7	17	14
8	18	15
9	19	16
A	20	17
B	—	18
C	—	19
D	—	20
E	—	21
F	—	22

Notes

- Switch positions 0 and I are not effective for the DVW-250P (PAL).
- Switch positions B to F are not effective for the DVW-250 (NTSC).
- Select lines for the VITC which are not occupied by VITS (Vertical Interval Test Signal) or VIRS (Vertical Interval Reference Signal).
- It is not possible to use line 11 (NTSC) or 8 (PAL) because these carry the reference subcarrier signal.

2 Set the VITC REC switch to ON.

The VITC will be recorded on the tape with the video signals. Note that LTC is always recorded.

Checking the VITC

1 Set the DISPLAY switch by the status indication panel to TC.

2 Set the DISPLAY switch in the time code setting controls to VITC.

The status indication panel shows the VITC value.

Inserting the real time in VITC

Follow the procedure under "Setting the user bits to reflect the real time" *(see page 4-8),* selecting VITC U-BIT in step **2,** and setting the REAL TIME record/set switch to REC ON in step 4.

Recording LTC

The LTC (Longitudial Time Code), including user bits, is automatically recorded together with the video and audio signals. No switch settings are required.

Checking the time code and user bits

*See Section 5-3 "Reading and Displaying Time Code **and** User Bits" (page 5-5).*

4-1-7 Locking the Time Code Generator to an External Signal

It is possible to lock this unit to an external time code generator, or alternatively to lock an external device to the time code generator in this unit.

Locking this unit to an external time code

1 Turn the POWER switch off.

2 Connect the time code output from the external device to the TC IN connector of this unit, and the video output to the VIDEO IN connector.

See the connections for the first DVW-250/250P in the figure "Example connections for time code locking" *(page 4-12).*

3 Set the F-RUN/R-RUN switch on this unit to F-RUN.

This locks the time code generator in this unit to the external time code signal.
Once the time code generator has been locked, the time code continues in sync even if the signal is disconnected from the TC IN connector. In this case the accuracy of time code synchronization is determined by the accuracy of the generator of the sync signal for the input video signal. If the signal is then disconnected from the VIDEO IN connector, the accuracy is that of the internal time code generator.

Notes on external locking of the time code generator

- The effect of carrying out steps 2 and 3 of the above procedure with the POWER switch on and a cassette loaded depends on the setting of the MODE switch, as follows:

  SAVE: The external lock applies when the tape transport is stopped, recording is paused, and during recording.

  PB/EE or PB: The external lock applies only during recording. To apply the external lock at other times, either carry out step 1 above, or press the REC button, putting the unit into E-E mode.

- Once the unit is locked to an external time code, color framing is disabled. To apply the color frame lock, first switch the F-RUN/R-RUN switch to R-RUN, then return it to the F-RUN position.

For an explanation of the color frame lock, see the footnote on page 2-4.

Locking the user bit value to an external signal

First lock the unit to an external time code source, then set the EXT-LOCK/U-BIT switch to ON. This locks the user bit values on this unit to the user bit values included in the external time code.
When the EXT-LOCK/U-BIT switch is set to OFF, the user bit values are not affected by the external signal.

Settings for the output from the TC OUT Connector

The following setup menu items affect the output from the TC OUT connector.

For details of setup menu operations, see Section 6-3 "Setup Menu Settings, " <SYSTEM 2> menu (page 6-4).

"TC OUT" item

This selects either of the following as the output from the TC OUT connector:

GEN: the signal output by the time code generator

AUTO: the signal output by the time code generator during recording or in E-E mode, and the LTC signal from the tape during playback

"TC DELAY" item

This selects the LTC phase correction for the output from the TC OUT connector as follows:

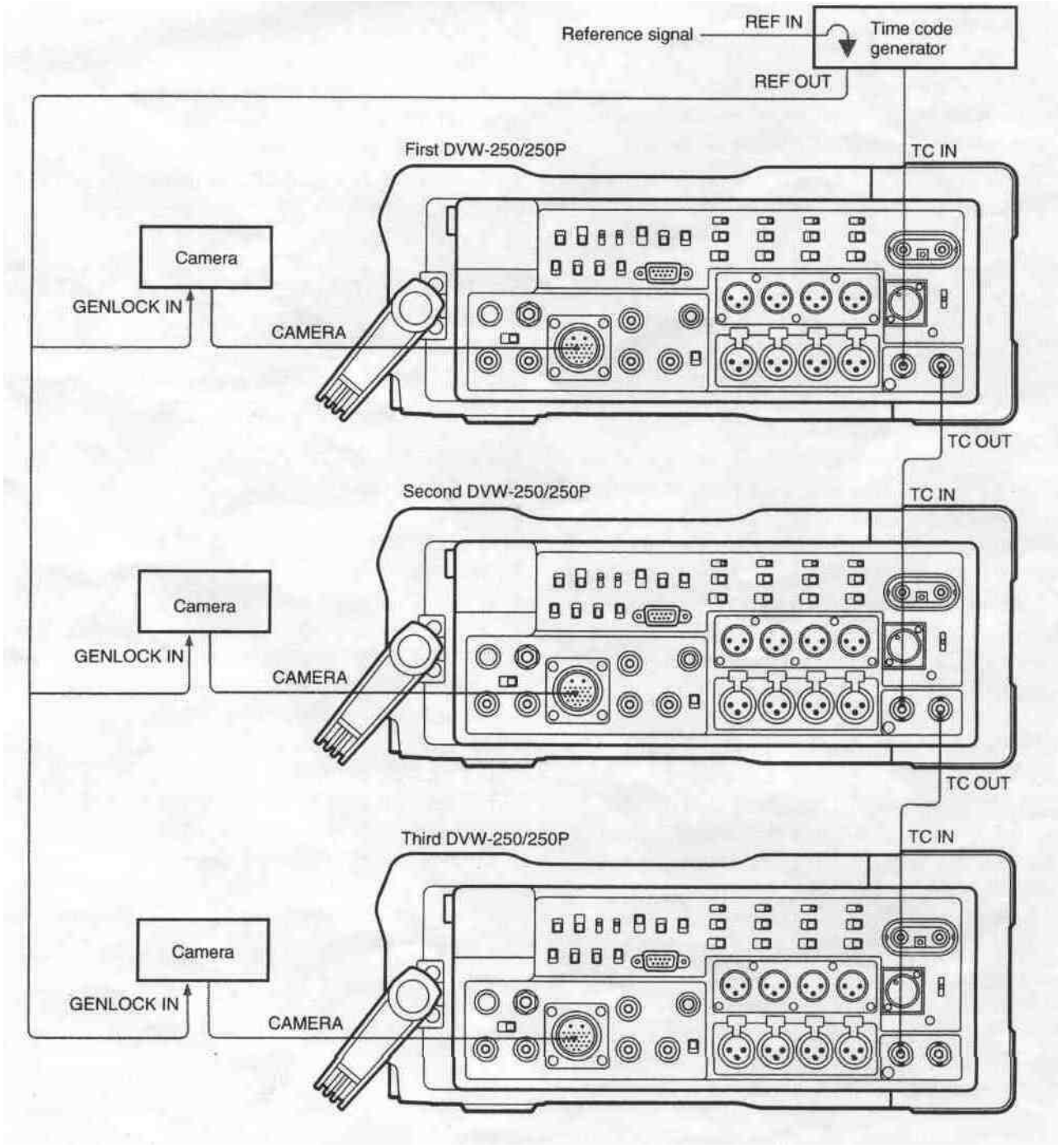
OFF: the signal selected by the "TC OUT" item without correction

AUTO: the LTC signal adjusted to correspond to the video output

Time Code Locking of Two or More DVW-250/250P Units

Connect the DVW-250/250P units as shown in the figure below.
In this case, on each of the DVW-250/250P units, set the F-RUN/R-RUN switch to F-RUN and the CONFI switch to ECC or OFF.

Then set the first DVW-250/250P so that it outputs the time code generator signal from the TC OUT connector. For example, when the "TC OUT" item is set to "AUTO" *(see previous page)*, the unit must be in the E-E mode.

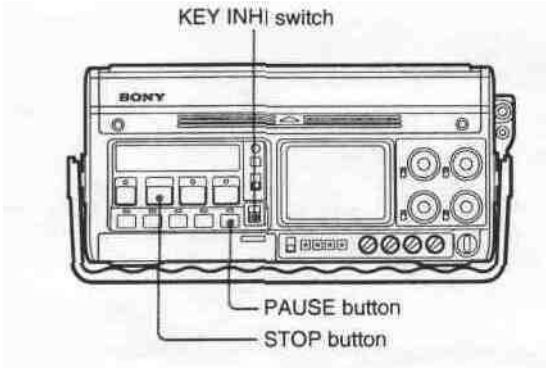


Example connections for time code locking

4-2 Procedures for Recording

This section describes how to prevent inadvertent operations during recording, and how to carry out the actual recording.

4-2-1 Preventing Inadvertent Operations During Recording



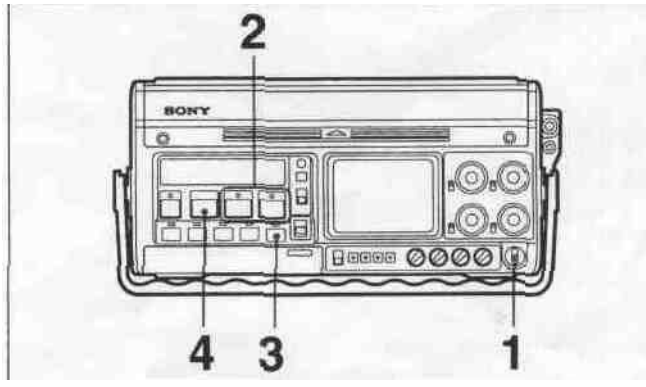
Preventing inadvertent operations

To prevent an unintended operation from affecting the unit, during recording normally the operation of all controls except the STOP and PAUSE buttons is inhibited.
To prevent even the STOP and PAUSE buttons from operating, switch the KEY INHI switch to ON after starting recording.
At the end of recording, return the KEY INHI switch to OFF, then press the STOP button.

4-2-2 Recording Video and Audio

The recording procedure depends on whether or not the CAMERA connector was selected in the procedure described in the section "Selecting the input video signal" *(page 4-3)*.

Recording the input signals from the CAMERA connector



Recording video and audio
(signals input from the CAMERA connector)

1 Switch the POWER switch on, and load a cassette.

2 Hold down the REC button, and press the PLAY button.

3 Press the PAUSE button on the DVW-250/250P or the VTR START button on the camera.

Recording starts.

4 To end recording, press the STOP button.

Pausing recording

- **After starting recording with the VTR START button on the camera:** press the VTR START button on the camera once more. In this case the PAUSE button on the DVW-250/250P does not operate.
- **After starting recording with the PAUSE button on the DVW-250/250P:** press the PAUSE button or the VTR START button on the camera. In either case the PAUSE indicator flashes, and the DVW-250/250P enters the paused state. To restart recording, press the VTR START button on the camera or the PAUSE button on the DVW-250/250P.

4-2 Procedures for Recording

Recording the input signals from the VIDEO IN connector or SDI IN connector

1 Switch the POWER switch on, and load a cassette.

2 Hold down the REC button, and press the PLAY button.

Recording starts, except that if there is no video signal input to the VIDEO IN connector or SDI IN connector recording does not start.

3 To end recording, press the STOP button.

Pausing recording

Press the PAUSE button. To restart recording, press the PAUSE button once more.
If the unit remains in the paused state for thirty minutes, the paused state is automatically ended to protect the tape, and the state is the same as after pressing the STOP button.

When the tape does not move

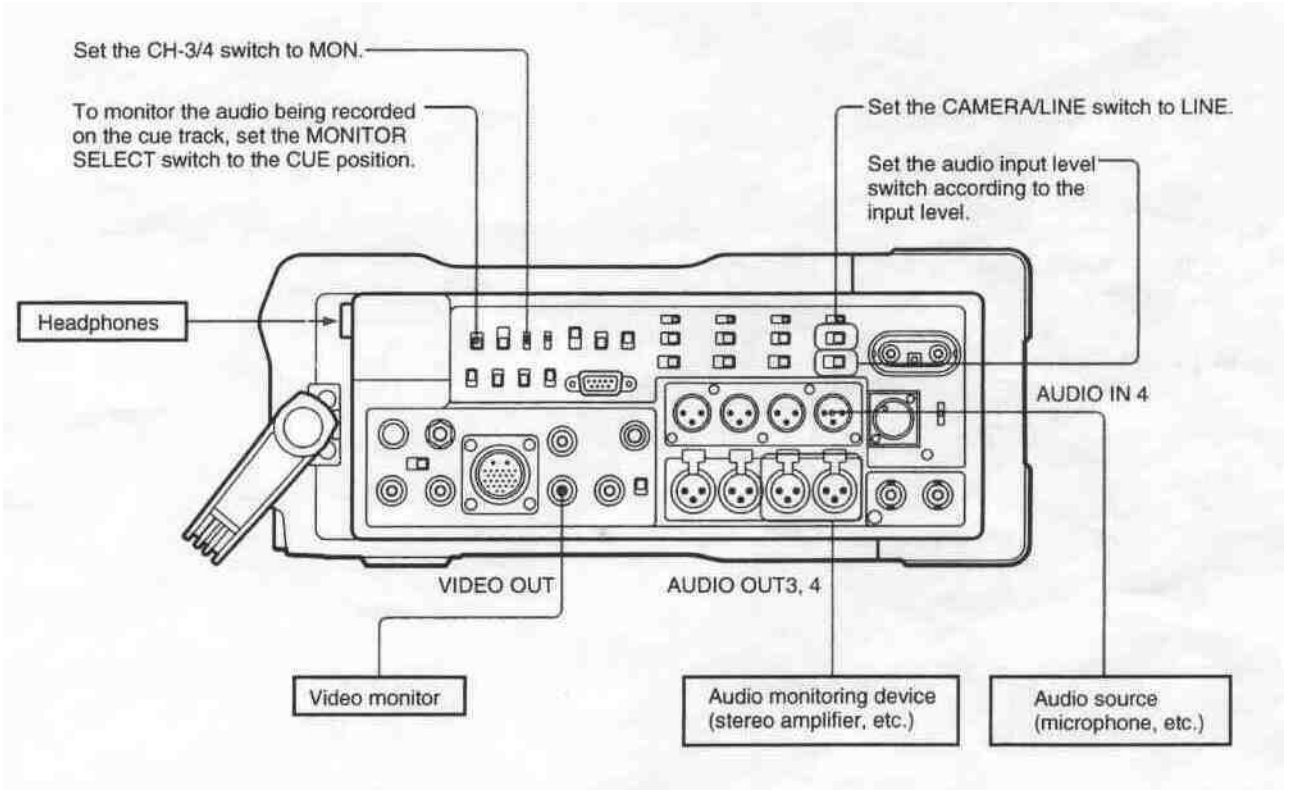
If no video signal is input, or if there is an input but the level is extremely low, the tape will not move. Check the video input level, referring to the section "Displaying and adjusting the video input levels" *(page 4-3)*.

4-2-3 Audio Dubbing on the Cue Track

In the Digital Betacam format, in addition to the digital audio channels recorded on the diagonal tracks, there is also a longitudinal track, referred to as the cue track, which can record a single analog audio channel.
The cue track can be used when adding an audio channel to an already recorded tape.

Connections and settings for audio dubbing

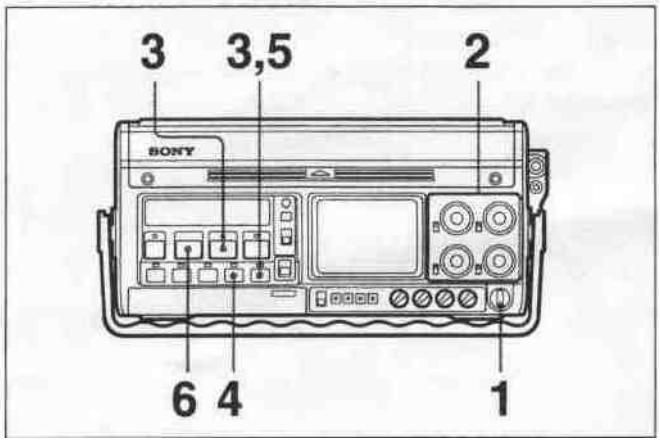
Connect the microphone or other audio source to the AUDIO IN connectors. In audio dubbing, the input to channel 4 is recorded on the cue track.


Set the CH-3/4 switch to MON.
To monitor the audio being recorded on the cue track, set the MONITOR SELECT switch to the CUE position.
Set the CAMERA/LINE switch to LINE.
Set the audio input level switch according to the input level.
Headphones
AUDIO IN 4
VIDEO OUT
AUDIO OUT3, 4
Video monitor
Audio monitoring device (stereo amplifier, etc.)
Audio source (microphone, etc.)

Connections and settings for audio dubbing

4-2 Procedures for Recording

Audio dubbing



Audio dubbing on the cue track

1 Switch the POWER switch on, and load a cassette.

2 Adjust the recording level of the audio source to be recorded on the cue track.

For details, see the section "Adjusting the recording levels " (page 4-5).

3 Press the PLAY button to play back the tape, then press the PAUSE button at the point from which you wish to dub the audio.

This pauses the tape transport.

4 Press the CUE DUB button.

The indicator lights.

5 Press the PAUSE button once more.

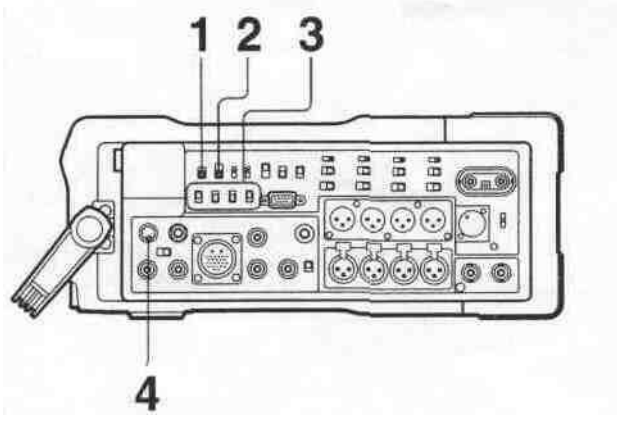
This ends the pause, and starts the audio dubbing.

6 To end the audio dubbing, press the STOP button.

In place of steps **3** to **5** above, pressing the PLAY button and CUE DUB button simultaneously also starts the audio dubbing.

5-1-1 Selecting the Sound to Be Monitored

Use the MONITOR SELECT switches to select the audio signals output from the EARPHONE jack and HEADPHONES jack during playback. When the CH-3/4 OUT switch is in the MON position, these switches also select the audio output from channels 3 and 4 of the AUDIO OUT connectors.



1 Of the MONITOR SELECT switches, first select the position of the CUE/DA switch.
CUE: Monitor the audio from the cue track.
DA: Monitor the channels selected from the digital audio recorded on the tape.

2 If you selected the DA position in step 1, set the next MONITOR SELECT switch to choose the channels monitored.
1/2: Audio channels 1 and 2
3/4: Audio channels 3 and 4
MIX: A mix of those of the four channels for which the corresponding switches below are in the ON position.

3 If you selected the MIX position in step **2,** set the switches on for the channels to be monitored.

4 Turn the PHONE LEVEL control knob to adjust the audio level of the output to the EARPHONE and HEADPHONES jacks.

Selecting the outputs from channels 3 and 4 of the AUDIO OUT connectors

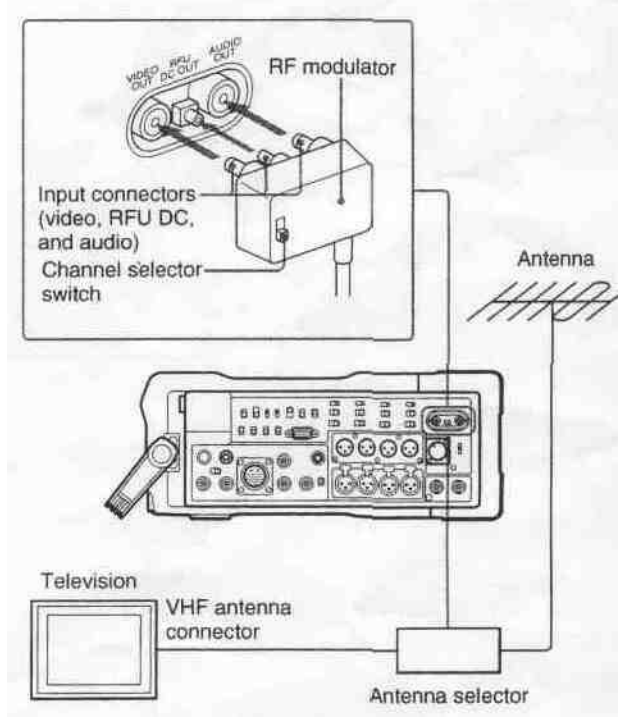
Set the CH-3/4 OUT switch as follows: to select the outputs from channels 3 and 4 of the AUDIO OUT connectors.

MON: the signals selected by the MONITOR SELECT switches
LINE: the signals of audio channels 3 and 4

5-1-2 Monitoring with a Television Without Video Input Connections

Connect the input connectors of an RF modulator to the RF signal output connectors (RFU DC OUT, VIDEO OUT and AUDIO OUT) on the connector panel.

For details of channels and antenna selector switching, refer to the operating instructions supplied with the RF ***modulator.***



Connections to an RF modulator

5-1-3 Using a Field Pickup Unit for Signal Transmission

An FPU (Field Pickup Unit) allows the playback signal from this unit to be radioed back to a broadcasting station.

MODE switch

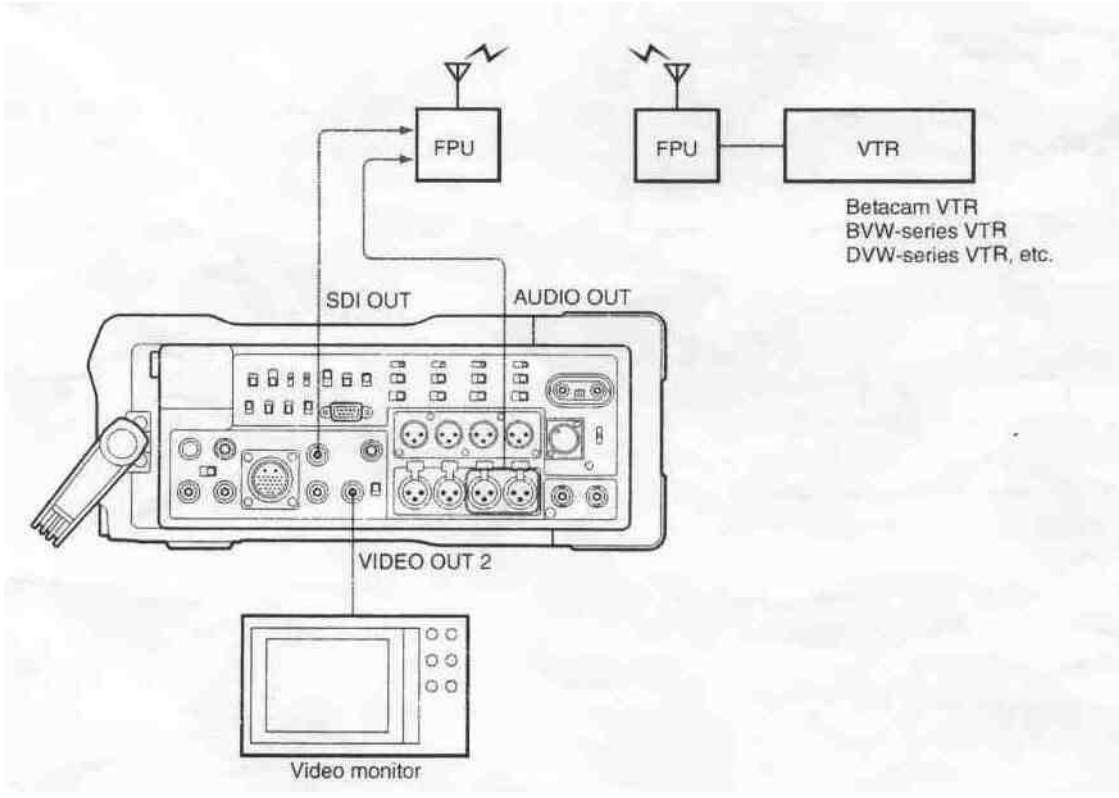
The MODE switch must be in the PB/EE position.

Audio signals

Audio signals from the DVW-250/250P to the FPU are output through channels 3 and 4 of the AUDIO OUT connectors.

Connections and settings

The following figure illustrates example connections for transmitting the playback signals by means of an FPU.



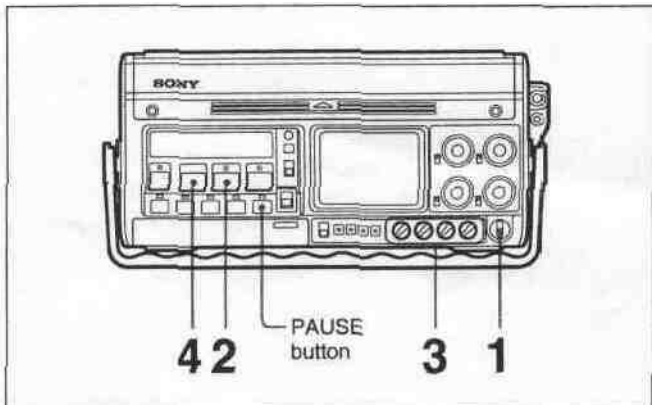
Example connections for transmitting the playback signals via an FPU

5-1-4 Playback Synchronized to an External Signal

Connect the synchronizing input signal to the VIDEO IN or SDI IN connector, and select the corresponding connector with the video input selector switch. This synchronizes playback on this unit to the input signal.

5-2 Procedures for Playback

5-2-1 Normal Speed Playback



Playback at normal speed

1 Switch the POWER switch on, and load a cassette.

2 Press the PLAY button.

Video and audio playback starts.

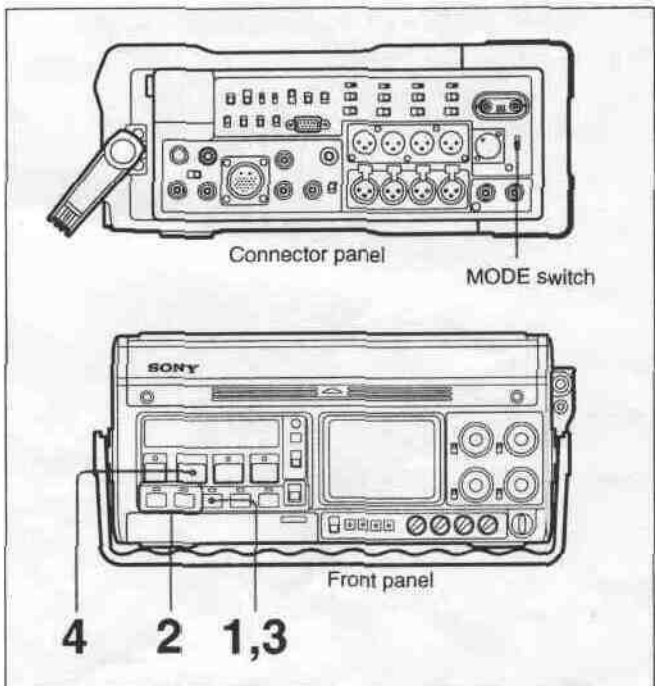
3 Turn the AUDIO PB LEVEL control knobs to adjust the audio playback levels.

4 To end playback, press the STOP button.

Pausing playback

Press the PAUSE button.
The PAUSE indicator flashes, and a color still picture appears on the video monitor.
To restart playback, press the PAUSE button once more.
If the unit remains in the paused state for eight minutes, the paused state is automatically ended to protect the tape, and the state is the same as after pressing the STOP button.

5-2-2 High Speed Searching



High speed searching

1 Press the SEARCH button.

The SEARCH indicator flashes, and a color still picture appears on the video monitor.

2 • To search forward, press the F FWD button.
• To search back, press the REW button.

This starts a color picture playback at the speed selected in a setup menu item (approximately 2 times, 5 times or 8 times normal speed).

For details of the setup menu operation, see Section 6-3 "Setup Menu Settings," item "SEARCH" in the <SYSTEM]> menu (page 6-4).

3 Press the SEARCH button once more.

The SEARCH indicator goes off, and the DVW-250/250P switches to fast forward or rewind mode. At this point, if the MODE switch on the connector panel is set to PB, color playback is provided up to a maximum speed of approximately 24 times normal. If the MODE switch is set to PB/EE, an E-E signal is output to the monitor, when the MODE switch is set to SAVE, there is no video output.

(Continued)

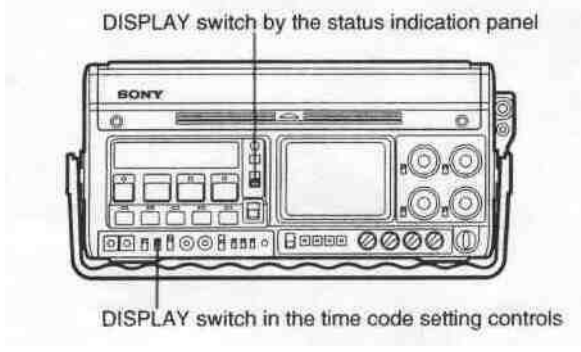
4 To end the search operation, press the STOP button.

Automatic ending of the search operation
If the tape transport is not operated for eight minutes after pressing the SEARCH button, the search operation is automatically ended to protect the tape.

5-3 Reading and Displaying Time Code and User Bits

During playback, the internal time code reader reads the time code and user bits recorded on the tape. You can display the time code values read in the status indication panel.

Displaying time code or user bit values in the status indication panel

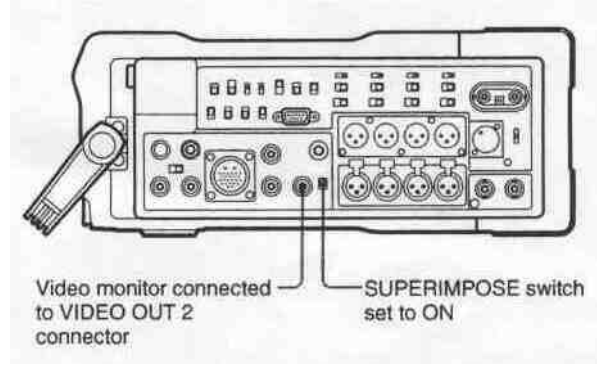


Displaying time code or user bit values in the status indication panel

To select the values displayed, set the two DISPLAY switches, by the status indication panel and in the time code setting controls, as shown in the following table.

Values displayed		DISPLAY switch by the status indication panel	DISPLAY switch in the time code setting controls
Time code	LTC	TC	LTC
	VITC		VITC
User bits	LTC	U-BIT	LTC
	VITC		VITC

Displaying time code and user bit values on the monitor screen



Displaying time code and user bit values on the monitor screen

With a time code or user bit value displayed in the status indication panel, connect the video monitor input connector to the VIDEO OUT 2 connector, and set the SUPERIMPOSE switch to ON.

This displays the same value on the monitor screen as in the status indication panel.

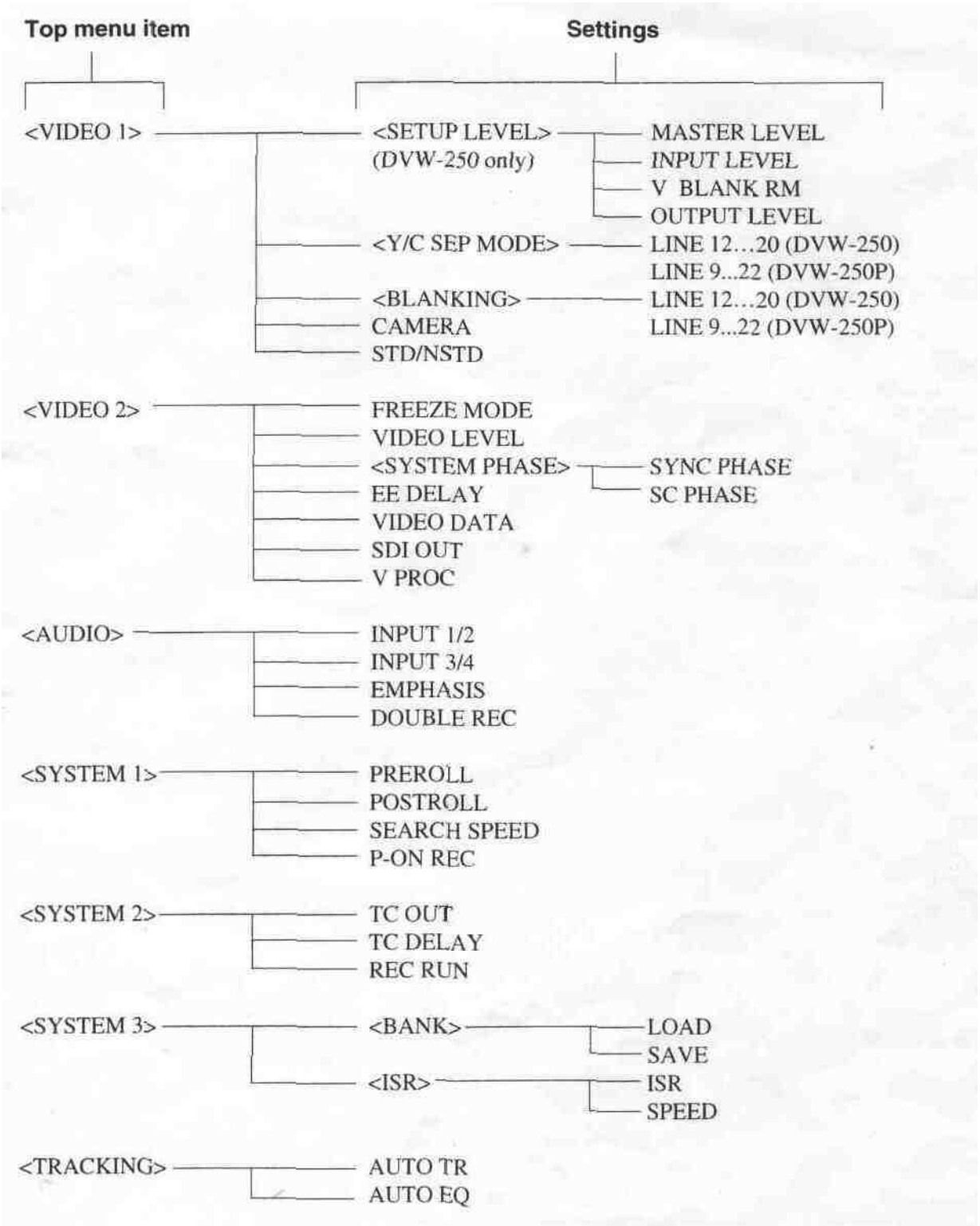
Outputting the playback time code from the TC OUT connector

By means of a setup menu setting, it is possible to select the signal from the TC OUT connector to be the time code from the tape during playback.

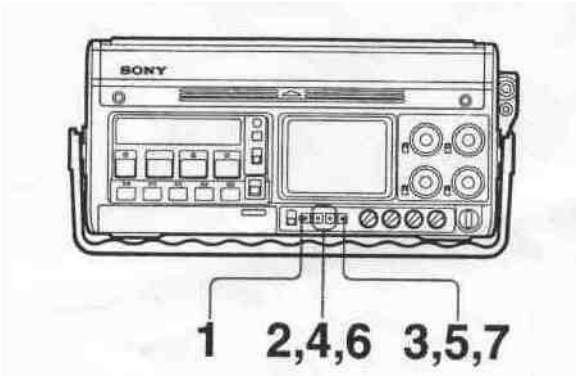
For details of the setup menu operation, see Section 6-3 "Setup Menu Settings, " item "TC OUT" in the <SYSTEM 2> menu (page 6-4).

6-1 Setup Menu Organization

The initial setup menu (referred to as the top menu) gives access to seven submenus. Each of these is used to display and change the settings of various items. In some cases there are also further nested submenus. The following diagram shows the tree structure of the menus. Items enclosed in angle brackets are submenus.



Making setup menu settings



Making setup menu settings

1 Press the DISPLAY button in the adjustment controls once or twice until the setup menu appears in the display.

Pressing the DISPLAY button cycles the display through the video level meters, setup menus, and audio level meters. If the display is showing the video level meters or setup menus, and five minutes elapse without an operation, the display automatically reverts to the audio level meters.

2 Press the UP or DOWN button in the adjustment controls to align the asterisk cursor (^) with the required item (submenu).

Example: Top menu

```
SETUP MENU
*<VIDEO 1>
 <VIDEO 2>
 <AUDIO>
 <SYSTEM 1>
 <SYSTEM 2>
 <SYSTEM 3>
 <TRACKING>
```

3 Press the SET button.

This displays the selected submenu. Further submenus are enclosed in angle brackets (<SETUP LEVEL> in the following example).

Example: <VIDEO 1> menu

```
VIDEO 1
*<SETUP LEVEL>
 <Y/C SEP MODE>
 <BLANKING>
 CAMERA
 STD/NSTD
 EXIT
```

4 Press the UP or DOWN button to align the asterisk cursor (^) with the required item.

5 Press the SET button.

This allows the value for the selected item to be changed.
In cases where there are further nested submenus, repeat steps 4 and 5 as required.

Example: <SETUP LEVEL> menu

```
SETUP LEVEL
*MASTER      7.5
 INPUT       MST
 V BLANK RM   ON
 OUTPUT      0.0
 EXIT
```

6 Press the UP or DOWN button to change the setting.

7 When the required value is displayed, press **the** SET button.

This confirms the new setting. To continue by changing another setting, repeat from step 4.

Returning to the parent menu

Select the "EXIT" item, and press the SET button, **or** press the DISPLAY button.

Setup menu settings

Top menu item	Submenu items (nested submenus in angle brackets)		Function	Setting values
<VIDEO 1>	<SETUP LEVEL> (DVW-250 only)	MASTER LEVEL	Master level	0.0 % to 10.0 % in 0.5 % steps
		INPUT LEVEL	Setup level of input signal	0.0 % to 10.0 % in 0.5 % steps MST. same value as master level
		V BLANK RM	Setup elimination in vertical blanking interval	OFF: no setup elimination ON: Carry out setup elimination
		OUTPUT LEVEL	Setup level of output signal	0.0 % to 10 0 % in 0 5 % steps MST: same value as master level
		EXIT	Return to <VIDEO 1> menu	—
	<Y/C SEP MODE>	LINE 12. 20 (DVW-250)	Toggle Y/C separation for each line.	BPF- Carry out Y/C separation. B/W: no Y/C separation, treat as Y signal.
		LINE 9 -22 (DVW-250P)		
		EXIT	Return to <VIDEO 1> menu.	—
	<BLANKING>	LINE 12...20 (DVW-250)	Toggle blanking for each input line	THRU no blanking BLNK- blank input line
		LINE 9 .22 (DVW-250P)		
		EXIT	Return to <VIDEO 1> menu.	—
	CAMERA		Select input signal from camera	ANA: Y/R-Y/B-Y signal DIGI: digital signal AUTO: Select automatically, depend'ng on whether camera ^s output! ng a digital signal
	STD/NSTD		Select standard/nonstandard composite input signal.	AUTO Select automatically, depending on whether luminance and chrominance signals are interleaved. STD Always use standard signal. NSTD Always use nonstandard signal. If the color framing of the input video signal is unstable, select NSTD.
	EXIT		Return to top menu.	—
<VIDEO 2>	FREEZE MODE		Select freeze mode	FLD Freeze single field FRM- Freeze frame.
	VIDEO LEVEL		Set the video output level.	-3 dB to +3 dB in 0.1 dB steps
	<SYSTEM PHASE>	SYNC PHASE	Adjust the phase of the sync signal	-8 to +8 in 1 sc steps (DVW-250) -9 to +9 in 1 sc steps (DVW-250P)
		SC PHASE	Adjust the subcarner phase of the sync signal	0 to 965 in 0.29 nsec steps (DVW-250) 0 to 779 in 0.29 nsec steps (DVW-250P)
		EXIT	Return to <VIDEO 2> menu	—
	EE DELAY		Select the sync phase in E-E mode	SYNC: output in phase with playback. VID: in phase with E-E signal
	VIDEO DATA		Set the word length for digital video output signals	8 or 10 bits
	SDI OUT		Toggle serial digital output on and off.	ON: output OFF no output
	VPROC		When the color framing information in a recorded signal is not continuous, select whether or not to suppress the picture shift.	OFF: Picture will not shift by processing the output video ON: Picture shifts if recorded color framing is not continuous.
<	EXIT		Return to top menu.	—

(Continued)

Setup menu settings (Continued)

Top menu item	Submenu items (nested submenus in angle brackets)	Function	Setting values
<AUDIO>	INPUT 1/2	Select audio input for channels 1 and 2 when digital video input is selected	ANA analog audio input DIGI digital audio input
	INPUT 3/4	Select audio input for channels 3 and 4 when digital video input is selected	ANA analog audio input DIG! digital audio input
	EMPHASIS	Toggle emphasis on analog audio input	OFF no emphasis ON Apply emphasis
	DOUBLEREC	Toggle simultaneous recording of audio channels 1 and 2 on channels 3 and 4	OFF Record separate signals on channels 1/2 and 3/4 ON Record same signals on channels 1/2 and 3/4
	EXIT	Return to top menu	—
<SYSTEM1>	PREROLL	Set the preroll time for editing using the REMOTE connector	0 to 10 seconds in 1 second steps
	POSTROLL	Set the postroll time for editing using the REMOTE connector	0 to 10 seconds in 1 second steps
	SEARCH	Select the tape speed in search operations	(Both forward and reverse) X2 2 times normal speed X5 5 times normal speed X8 8 times normal speed
	P-ON REC	Select whether to start recording automatically at power on	OFF Do not start recording ON Start recording
	EXIT	Return to top menu	—
<SYSTEM 2>	TCOUT	Select the signal output from the TC OUT connector	GEN time code produced by the time code generator AUTO during recording (including E-E mode), the time code produced by the time code generator, during playback, the LTC signal from the tape
	TC DELAY	Toggle the LTC phase correction for the output from the TC OUT connector	OFF no phase correction to LTC signal AUTO Adjust phase of LTC signal to correspond to the video output
	REC RUN	Select time code recorded when F-RUN/R-RUN switch set to R-RUN	INT time code produced by time code generator TAPE time code played back from tape
	EXIT	Return to top menu	—

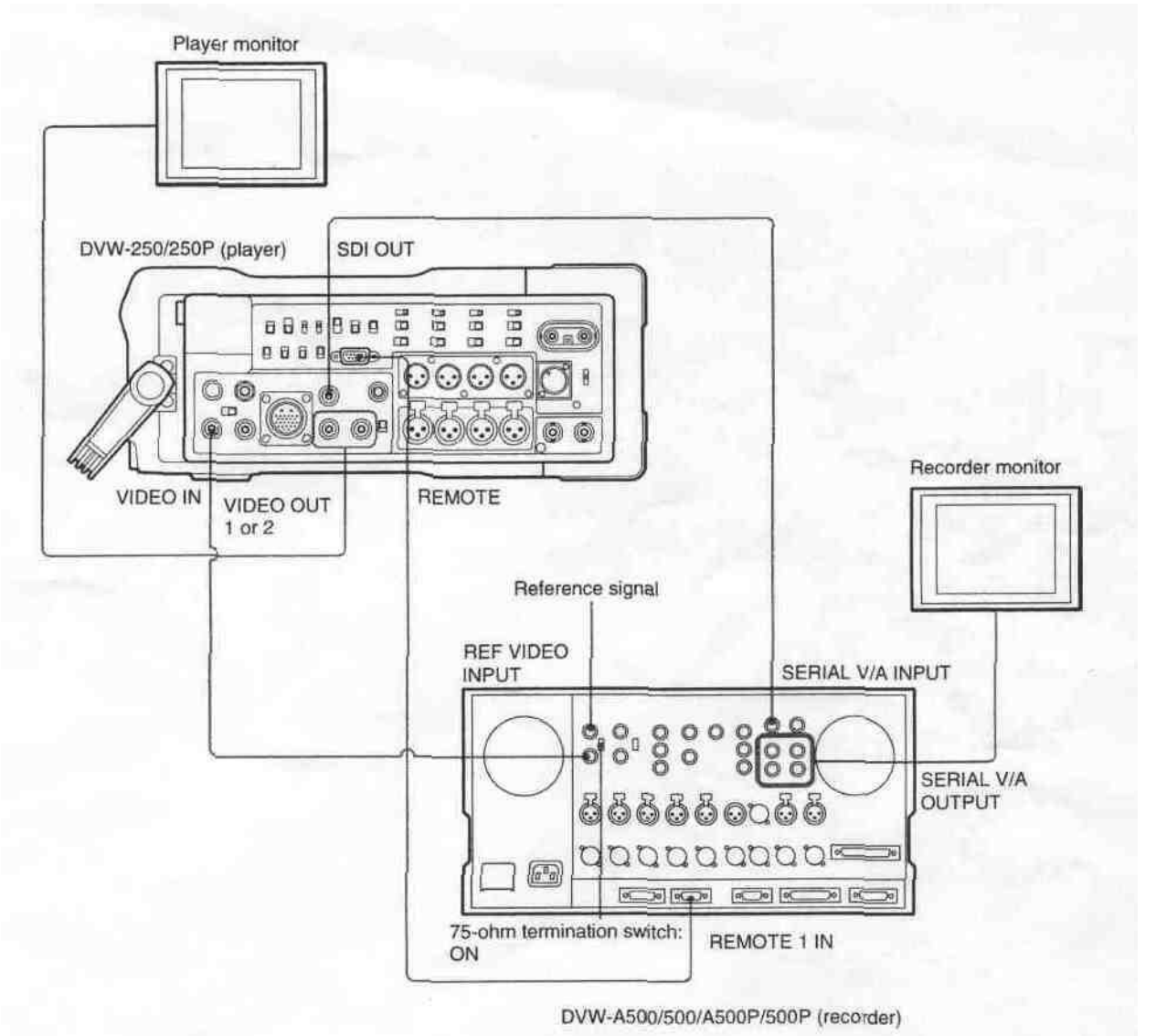
(Continued)

Setup menu settings (Continued)

Top menu item	Submenu items {nested submenus in *angle* brackets)		Function	Setting values
<SYSTEM 3>	<BANK>	LOAD	Select one of the bank numbers then press the SET button to read in the setup data from a memory bank.	0: factory default setup data. 1: setup data from bank 1. 2: setup data from bank 2. 3: setup data from bank 3.
		SAVE	Select a bank number, then press the SET button to save the current setup data in a memory bank.	1: save in bank 1. 2: save in bank 2. 3: save in bank 3.
		EXIT	Return to <SYSTEM 3> menu.	—
	<ISR>	ISR	Select whether to use REMOTE connector for ISR (Interactive Status Reporting).	OFF: no ISR; use as Sony 9-pin protocol interface. ON: use as ISR interface.
		SPEED	Set data transmission speed in ISR mode.	19200, 9600, 4800, 2400 or 1200 bps
		EXIT	Return to <SYSTEM 3> menu.	—
<TRACKING>	AUTO TR		Select whether to carry out outo tracking.	OFF: no auto tracking ONE- auto tracking once, when tape is loaded ON: continual auto tracking
	AUTO EQ		Select whether to activate the auto equalizer.	OFF: no auto equalizer ON: activate auto equalizer
	EXIT		Return to top menu.	—

7-1 When Not Using an Editor

The following figure shows connections for using the DVW-250/250P as player and a DVW-A500/500/A500P/500P Digital Videocassette Recorder as recorder.

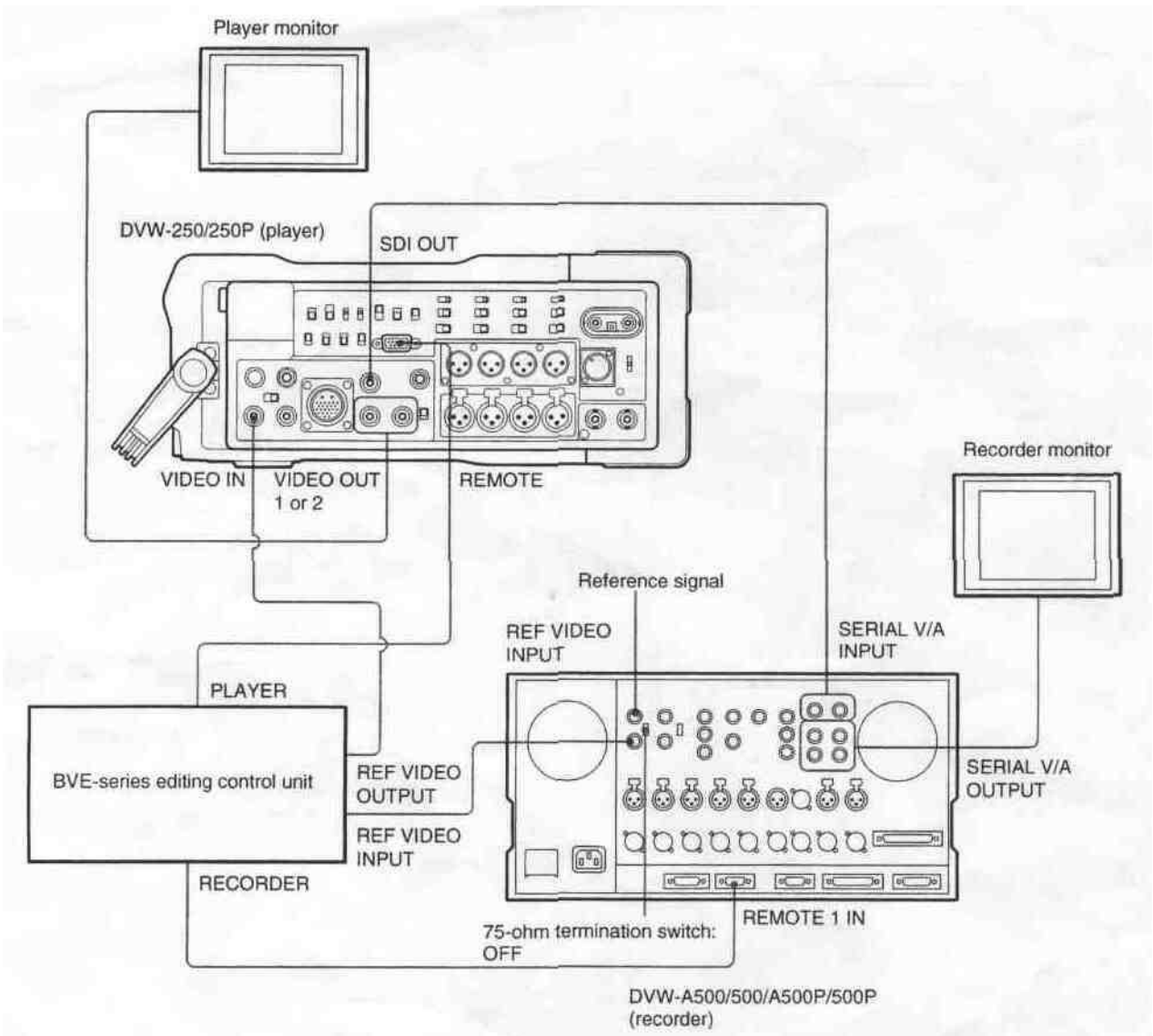


Example configuration not using an editor

7-2 Using an Editor

Example 1

The following figure shows connections for using the DVW-250/250P as player, a DVW-A500/500/A500P/500P Digital Videocassette Recorder as recorder, and a BVE-series editing control unit.



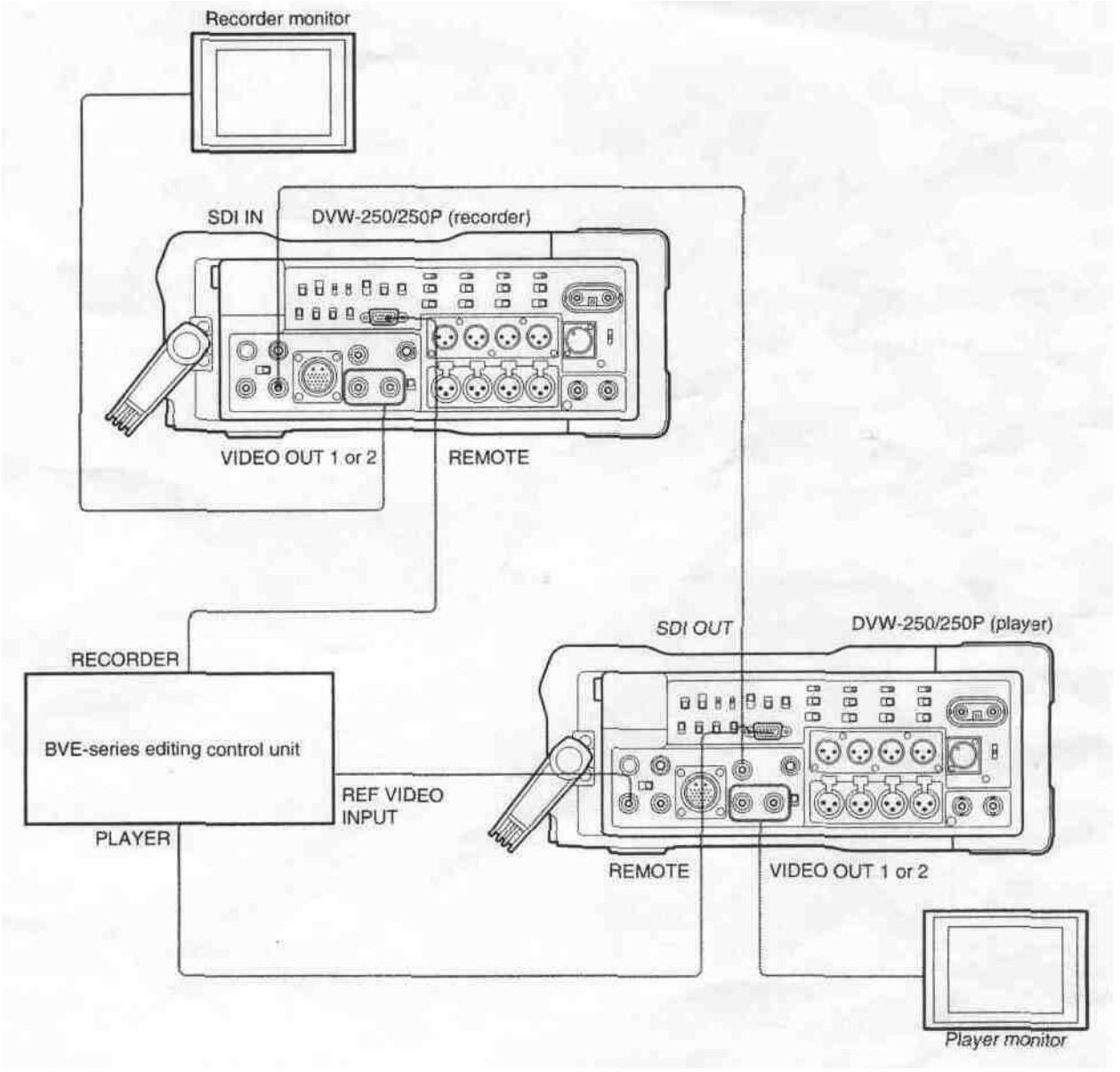
Example configuration using an editor (1)

Example 2

The following figure shows connections for using two DVW-250/250P units as recorder and player, with a BVE-series editing control unit.

Note

If you use a DVW-250/250P as recorder, only assemble editing is possible.



Example configuration using an editor (2)

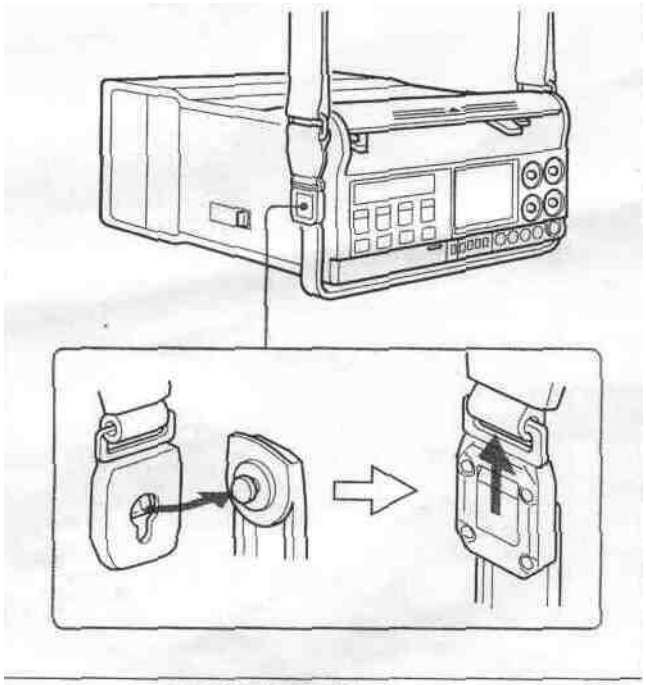
Warning Indications

If a fault occurs during operation, a warning is given by an indication in the status indication panel, and the WARNING indicator lights or flashes. If you are monitoring the audio with headphones or an earphone, there is also an audible warning tone.
If a warning is given, use the following table to determine the appropriate measures to be taken.

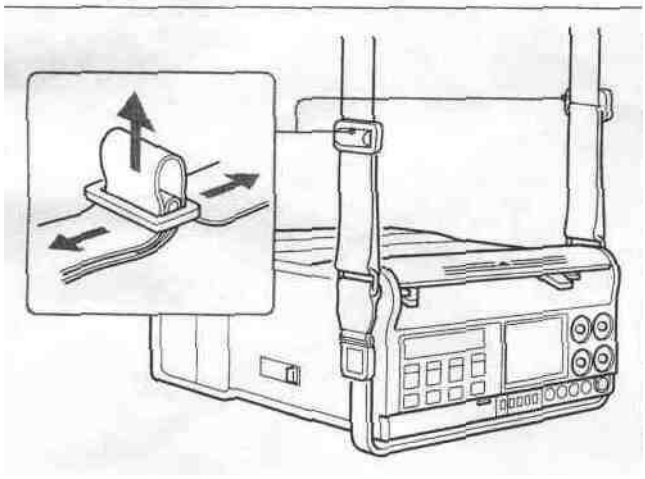
Status indication panel	WARNING indicator	Warning tone	VTR action	Fault	What to do
RF	Flashing four times per second	Four beeps per second	The recording operation continues, but correct recording is not obtained. Correct playback is also not possible.	The video heads are clogged, or there is some other fault in the recording and playback system.	Carry out head cleaning, using a BCT-5CLN or BCT-D12CL Cleaning Cassette. If the problem persists after cleaning the heads, disconnect the power and consult your Sony service representative.
SERVO	Flashing four times per second	Four beeps per second	Recording continues, but the correct recording is not possible.	The servo lock has been lost.	Disconnect the power and consult your Sony service representative.
HUMID	Continuous	Four beeps per second Continuous, or	Recording continues, but if the tape sticks to the drum recording stops. Playback, rewind, or fast forward stops.	There is condensation.	Stop the tape transport. Leave the unit powered on, and wait until the HUMID indication disappears.
SLACK	Flashing four times per second	Continuous	The operation stops.	The tape is not wound properly.	Eject the cassette. *(See the supplied Maintenance Manual Part 1)*
TAPE (flashing, once per second)	Flashing once per second	One beep per second	Recording continues.	The tape is near the end.	Change the cassette when necessary.
	Continuous	Continuous	Recording stops.	The tape is at the end.	Change the cassette.
BATT (flashing, once per second)	Flashing once per second	One beep per second	Recording continues.	The battery is almost exhausted.	Change the battery when necessary.
	Continuous	Continuous	Recording stops.	The battery is exhausted.	Change the battery.

Using the Shoulder Strap and Carrying Case

Fitting the shoulder strap



Attaching the shoulder strap clips



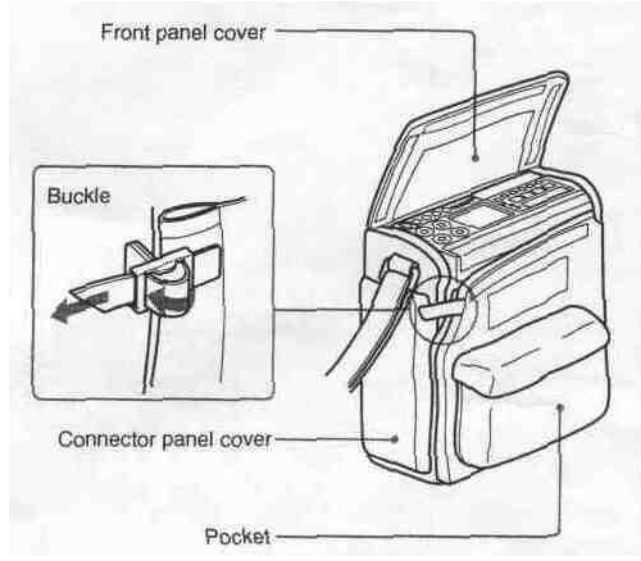
Adjusting the length of the shoulder strap

Fitting the optional carrying case (BKDW-250)

1 Remove the carrying case from its packing, and insert the cushioning material to give the case its shape.

2 Insert the DVW-250/250P in the carrying case.

3 Do up the side fasteners, and fasten with the buckle.



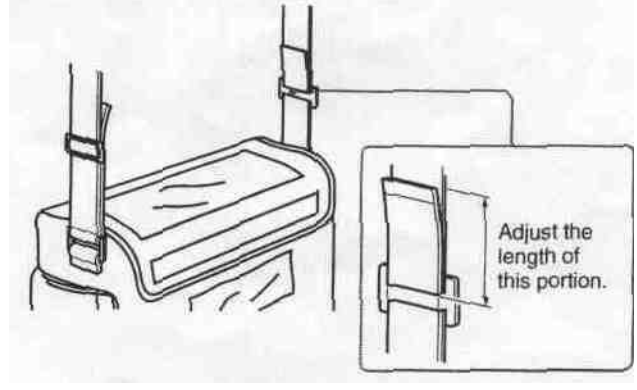
Fitting **the** optional carrying case

Note

In the following environments, if the unit is operated continuously in the carrying case it may become hot.

- In direct sunlight
- In a car on a hot sunny day
- Near heating appliances

In such cases avoid removing the unit from the carrying case, as this may result in bums or injury.



Adjusting the length of the carrying case strap

Specifications

General

Power requirements	12 V DC+5.0 V/-1.0V
Power consumption	Approx. 28 W (with CONFI switch at OFF, SDI OUT setting at OFF)
	39 W maximum
Operating temperature	0 °C to 40 °C (32°F to 104°F)
Storage temperature	-20 °C to +60 °C (-4°F to 140°F)
Operating relative humidity	25 % to 85 %
Mass	Unit alone: approx. 6.6 kg (14 lb 8 oz)
	With battery pack and small cassette: approx. 7.7 kg (16 lb 15 oz)
Maximum external dimensions (w/h/d)	317 x 140 x 349 mm (12 5/8 x 5 5/8 x 13-1/4 inches)
Recording format	Digital Betacam
Tape speed	Approx. 96.7 mm/s
Recording/playback time	Using BCT-D124L: maximum 124 minutes
	Using BCT-D40: maximum 40 minutes
Fast forward/rewind time	Maximum 390 seconds minutes (using BCT-D124L)
	Maximum 160 seconds minutes (using BCT-D40)
Fast forward/rewind speed	Approx. 24 times normal speed
Search speed	Maximum 8 times normal speed (selectable x2, x5, x8)
Servo lock time	Maximum 1 seconds (from paused state)
Loading/unloading time	Maximum 4.5 seconds
Battery pack used	BP-90A (nickel-cadmium) or BP-L60 (lithium ion)
Cassette tapes used	BCT-D6/D 12/D22/D32/D40 BCT-D34L/D64L/D94L/ D124L

Video characteristics

Sampling frequency	Y: 13.5MHz
	R-Y/B-Y: 6.75 MHz
Quantization	10 bits/sample
Error correcting codes	Reed-Solomon
Error concealment	Adaptive three-dimensional
Compression	Coefficient recording system
Channel coding	S-NRZI PR-IV

Digital input to analog component output (Reference playback)

Frequency bands	Y: 0.5 to 5.75 MHz ±0.5 dB
	R-Y/B-Y: 0.5 to 2.75 MHz ±0.5 dB
Signal/noise ratio	62 dB minimum
K factor (2T pulse)	1 % or less

Analog component input to analog component output (Reference playback)

A/D quantization	10 bits/sample
Frequency bands	Y: 0.5 to 5.75 MHz +0.5/-0.7 dB
	R-Y/B-Y: 0.5 to 2.75 MHz +0.5/-0.7 dB
Signal/noise ratio	60 dB minimum
K factor (2T pulse)	1 % or less
LF nonlinearity	2% **or** less

Analog composite input to analog composite output

A/D quantization	10 bits/sample
Frequency band	0 to 5.5 MHz ±0.7 dB
Signal/noise ratio	56 dB minimum
Differential gain	2% or less
Differential phase	2% or less
Y/C delay	15 ns or less
K factor (2T pulse)	1 % or less

Specifications

Audio system

Sampling frequency 48 kHz (video sync)
Quantization 20 bits/sample
Input A/D quantization
20 bits/sample
Output D/A quantization
18 bits/sample
Frequency response 20 Hz to 20 kHz +0.5 dB/
-1.0 dB (reference level)
Dynamic range 95 dB minimum (1 kHz,
emphasis on)
Distortion 0.04% or less (1 kHz.
emphasis on, reference
level)
Crosstalk -80 dB or less (! kHz,
betweenchannels)
Wow and flutter Below measurable limit
Headroom 20dB(18dB)
Emphasis Tl = 50 *[is,* T2 = 15 us (on/off
selectable in recording
mode)

(Using 20-bit D/A reference playback)
Frequency response 20 Hz to 20 kHz (0.5 dB/-l .0
dB (reference level)
Dynamic range 100 dB minimum (1 kHz,
emphasis on)
Distortion 0.03% or less (1 kHz,
emphasis on, reference
level)
Crosstalk -80 dB or less (1 kHz,
betweenchannels)
Wow and flutter Below measurable limit

Inputs and outputs

Serial digital interface

SMPTE-259M/ITU-R BT.656
SDI IN (BNCxl) Serial digital component **inpul**
(including 4 audio
channels)
SDI OUT (BNCxl) Serial digital component
output (including 4 audio
channels)

Camera interface

CAMERA (26-pinxl)
Analog component video
incut
Y: 1.0 V p-p, 75Ω (negative
sync)
R-Y/B-Y: 0.7 V p-p, 75Ω
Serial digital component input (including 4 audio
channels)
Analog audio input -60/-20/+4 dB switchable
High impedance, balanced

Video interface

VIDEO IN (BNCxl)
Analog composite video input
1.0 V p-p, 75Ω
VIDEO OUT (BNCx2)
Analog composite video
output
1.0 V p-p, 75Ω, selectable
text superimposition on
output 2 only

Audio interface

AUDIO IN (XLRx4) Analog audio input
-60/-20/+4 dB switchable
High impedance, balanced
AUDIO OUT (XLRx4)
Analog audio output
+4 dBm (0 dBm)
Low impedance, balanced
HEADPHONES (stereo standard jack xl)
-)7dBu
EARPHONE (stereo minijack xl**)**
-17dBu

Time code interface

TC IN (BNC xl) Time code input
0.5 to 18 V p-p, impedance
10 kΩ ±10%
TC OUT (BNCxl) Time code output
1.0 V p-p (75Ω), 2.2 V p-p
(10kΩ)

Miscellaneous

REMOTE (9-pinxl)
Sony 9-pin protocol or RS-
232Cinterface
(switchable)
DC IN 12V(XLRxl)
Power supply from AC-550/
550CE AC Adaptor

DC OUT (miniature 4-pin xl)
Power supply to BVR-3 Remote Controller
RFU DC OUT, VIDEO OUT, AUDIO OUT
Interface for RF modulator

Processor adjustment ranges

Video input and output adjustment ranges ±3dB
System sync phase ±2 us

Supplied accessories

Shoulder strap (1)
Operation Manual (1)
Maintenance Manual Part 1 (1)

Recommended equipment

BKDW-250 Carrying Case
DVW-A500/500/A500P/500P Digital Videocassette Recorder
BP-90A and BP-L60 Battery Packs
BC-L 100/L 1 OOCE and BC-410/41 OCE Battery Chargers
AC-550/550CE AC Adaptor
BVR-3 Remote Controller
RF Modulator RFU-95UC (U.S.A.and Canada)
RFU-99E (Europe)
RFU-90AS (Australia)
RFU-95CH (China)
Mainteance Manual Part 2

Design and specifications are subject to change withoutnotice.

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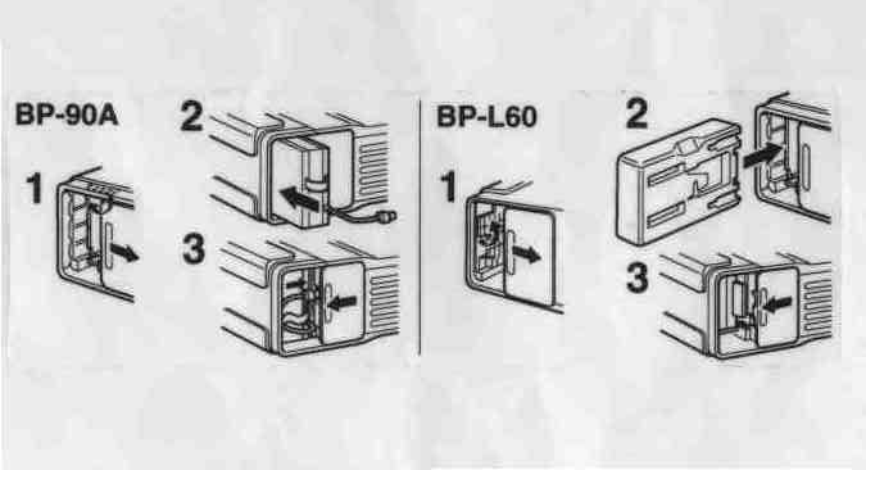
BP-90A
1
2
3
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2
3